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Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association and Minneapolis Surgical Society

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ORIGINAL ARTICLES

THE TREATMENT OF SIMPLE CASES OF DIABETES*

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In order to appreciate better the use of insulin in the treatment of diabetes mellitus without complication, we should first review the dietary progress made in the disease during the last few years. Certain fundamental principles have been laid down which have increased our success. Unless these facts are considered in our treatment, insulin will not receive the result that it deserves. There are four main principles to be reviewed.

In the last few years although there has been a reaction against extreme undernourishment established in Allen's and in Joslin's important works in relation to total dietary restriction, yet we must never forget the important step these men took in this disease. In the end, Allen's and Joslin's work has left one necessary factor to consider, namely, the limit of total calories necessary for body maintenance for the individual.

Joslin reported that before 1914 diabetic patients usually had a higher basal metabolic rate than normal individuals of the same height and weight. After Joslin's routine had been established he found the rate below the standard selected by Benedict and Joslin. Later Allen verified this work in thirty-six patients which he studied. Both men felt that the two chief factors that governed the increased rate were diet and acidosis. Works by other men have not agreed entirely with these statements. If the patient is well nourished, and secondary factors, as infection, hyperthyroidism, high protein and caloric diets, can be eliminated, a higher rate than normal does not necessarily occur. We realize also that acidosis under even lax diabetic supervision is usually more or less dependent on the same secondary factors as mentioned above. Out of this work, however, has emerged one definite idea, namely, that with the proper restriction of protein the metabolic rate can be brought below or even to normal, and thereby a diabetic patient can be made to burn his caloric intake or body tissues at a level more compatible to dietary restriction.

The second principle, namely protein restriction, has been developed from the work established out of the above results. A few years ago the physiologists were shocked when the clinician suggested the use of only one gram of protein per kilogram body weight in diabetic individuals. Newburgh and Marsh, however, suggested two-thirds of a gram of protein, and later Wilder and Boothby found that high protein intake definitely increased body metabolism in this disease. From this work it has been found that two-thirds of a gram of protein will generally maintain the adult patient in nitrogenous equilibrium. Today we also recognize that 58 per cent of the protein in the diet can be burned as glucose, which in the end may embarrass the body in its attempt to burn carbohydrates. In order to attain the low protein intake, however, and still maintain a nitrogenous balance the total caloric needs of the patient must be watched. Because of this fact, Newburgh and Marsh had their good results with the so-called high fat diet.

The third principle is based on clinical evidence, namely, that the pancreas should attempt to handle only the amount of carbohydrates that is below the glucose tolerance of that patient. This, of course, varies with each individual diabetic, but after a carbohydrate tolerance has been established, it is well to keep below that level, for by so doing, the pancreas is more apt to recuperate and return to a higher point of efficiency. In other words an overworked engine is more apt to break under the strain than one which is not held at its full capacity at all times.

*Presented in symposium before the Annual Meeting of the Minnesota State Medical Association, St. Paul, October, 1923.

The fourth principle is the result of Woodyatt's opposition to Allen's idea that marked restriction of fats was necessary to keep a diabetic patient away from acidosis and coma. Woodyatt felt that fats could be used as long as a definite molecular ratio was kept between the fatty acid and glucose. This idea was later proven clinically by Newburgh and Marsh and also by Shaffer in his experimental work. Shaffer found that it was necessary to have one molecule of glucose present in order to burn two molecules of fatty acid and thereby helped to develop an old statement of Joslin's that "fat burned better in the flame of carbohydrates." From this work has developed the principle of balancing the ketogenic (fatty acid) and antiketogenic (glucose) molecules in the diet. Usually one and a half to one relationship as suggested by Woodyatt is the best basis of safety.

Many charts have been devised as a short cut using the above principles in our dietary routine. They are all based in some way on this work, but it is worth while to review the formulae used in computing the proper balance of carbohydrates, protein and fat. In the end all food of a diet except a small fraction of the protein is broken down into two elements, namely, glucose and higher fatty acid. We know that

100 grams of carbohydrates give 100 grams of glucose and no fatty acid;

100 grams of protein give 58 grams of glucose and 46 grams (?) of fatty acid;

100 grams of fat give 10 grams of glucose and 90 grams of fatty acid, if burned in the body.

Therefore in the diet

Glucose=100 per cent carbohydrates plus 58 per cent protein plus 10 per cent fat;

Fatty acid=0 per cent carbohydrates plus 46 per cent protein plus 90 per cent fat.

With these formulae and keeping in mind the ratio of fatty acid to glucose, which will give the proper combustion, we can follow the principles mentioned above. It is necessary to remember that diabetic patients are better on a restricted diet than a higher caloric intake, and to add to this the fact that the metabolic rate can be controlled at a lower level if only two-thirds of a gram of protein is used for each kilogram body weight.

Wilder and Boothby have printed a very good chart for this work, and there have been a few developed by other men. These can be used very easily by the clinician, but he should never forget the basis of the work, namely, a lowering of the metabolic rate without loss of body tissue; low protein; low carbohydrates; and a safe ratio between the ketogenic and antiketogenic substances. These diets are generally called "low maintenance diet." Starvation as used by Allen originally is rarely necessary under this regime.

We can better understand the use of insulin in these patients if we keep in mind the principles mentioned above. Insulin in its preparation and standardization is not to be covered in this article. Due to the courtesy of the Toronto investigators and Eli Lilly, we were able to get a supply of iletin, the name given by Lilly to their preparation. Today we are using it in the University Hospital with splendid results. Because of the limited time we will not report the early results and difficulties encountered in this work. The standardization of this material is nearly perfected at this time and the indications and results will be covered in other articles.

Probably the best method of covering the treatment in uncomplicated diabetes is by reporting typical cases.

A female patient (No. 25960 U. H.), height 5 feet 2 inches, aged 59, had had diabetes for a year. The symptoms had been typical, and she had lost 30 pounds in weight. Six months ago the patient became discouraged and since that time had only restricted the carbohydrates moderately. There was a strongly positive diacetic and sugar reaction and on the day of admission to the hospital the laboratory reports showed a blood sugar of .40 per cent and a plasma dioxide combining power of thirty-six mm. of mercury. The basal maintenance diet was 1,170 calories. It was given as 16 grams of carbohydrates, 28 grams of protein and 115 grams of fat. This diet was continued for three days, and the diacetic test on the urine became negative. On the sixth day the patient was still showing 10 grams of sugar in the urine. On the seventh day starvation, as used under the old regime, was given, and the next day the patient was sugar free. Another day of starvation was allowed since the blood sugar still remained .20 per cent. On the following day we gave the former diet. After six days the patient was still sugar free, and the carbohydrates were increased 10 grams a day until the patient received 76 grams of carbohydrates. Glycosuria developed at this point, and therefore the diet was continued for six days showing an average of 10 grams of glucose excretion daily. Because of the inability of the patient to remain on a low diet in comfort, we decided to give 5 units of iletin to care for the excess of glucose excretion. Therefore the glucose tolerance for this instance would be 110 grams, according to Woodyatt's formulae. Taking this amount of glucose and returning to our relationship, which we wish to keep between the fatty acid and glucose, of one and a half to one gram of each, we are allowed 163 grams of fatty acid, and therefore the diet

should be carbohydrates 76 grams, protein 28 grams, and fat 148 grams. We usually allow the patient to leave the hospital on one gram of protein, if possible, and therefore the patient was later given a diet of carbohydrates 76 grams, protein 42 grams, and fat 115 grams, or a total caloric diet of 1,500 calories. Under this routine there was only a trace of sugar in the urine. Later a higher relationship of fatty acid to glucose was thought safe, and the patient was discharged on the following regime: carbohydrates 76 grams, protein 42 grams, and fat 200 grams, or nearly 2,400 calories. She was receiving five units of iletin daily.

The second case (No. 25734 U. H.) illustrates a more severe case in which the acidosis and glycosuria were more obstinate. The patient stated that he had been living on carbohydrates 25 grams, protein 50 grams, and fats 100 grams daily for a month. He stated that he had been excreting between 15 to 20 grams of glucose daily on this diet. For this reason and due to the fact that his blood sugar was .30 per cent and carbon dioxide combining power 25 mm. of mercury, it was thought best to watch his progress for a few days. Since we found that he showed a daily average of 28 grams of glucose excretion, we decided to place him on a basal maintenance diet of 1,700 calories. He was thirty-seven years old, weighed 145 pounds, and was 5 feet 10 inches in height. The distribution of his diet was carbohydrates 24 grams, protein 42 grams, and fat 153 grams. He was allowed to remain on this diet for eight days and was still showing a daily average excretion of 20 grams of glucose. The diacetic acid test was only faintly positive. On the above diet the glucose intake was 64 grams, but there were 20 grams of glucose excreted. Therefore, his tolerance was only 44 grams. As we thought from previous experience that a fast day would be of little value, we gave iletin to compensate for the 20 gram excretion, allowing 10 units of it a day. This was continued for a week and the glucose excretion fell to only 5 grams daily. We thought best at this time to restrict the amount of iletin given, for his blood sugar had fallen to only .06 per cent and we feared a hypoglycemia. Due to the low amount of carbohydrates in the diet, however, it was decided best to increase the carbohydrates rather than decrease the iletin, and accordingly the next day he was given 44 grams of carbohydrates, 42 grams of protein and 153 grams of fat. He now excreted only 5 to 8 grams of carbohydrates daily, and his blood sugar three hours after the iletin injection was .12 per cent. Later his caloric intake was increased, and he was discharged on carbohydrates 65 grams, protein 60 grams, and fats 215 grams, a total of 2,475 calories. He was taking 10 units of iletin a day when he left the hospital. This is an example where a possible hypoglycemia reaction might have occurred if the blood sugar had not been watched, and this also illustrates the principle of recuperative pancreatic power under proper treatment.

The first two cases illustrate the usual treatment and supervision given a mild case and a moderately severe one without marked acidosis. There are various other cases that would show interesting observations but in order to cover the field allotted to this paper, we will next turn to diabetes with severe acidosis or coma.

Case (No. ....., N. W.) is a very good example of what can be done under energetic treatment and constant supervision with iletin therapy without the use of sodium bicarbonate. A man aged 36, height 5 feet 8 inches, weight 145 pounds, had lost weight for the past three years. Six weeks before admission he developed symptoms of diabetes and refused treatment against the advice of his physician. Two days before entrance to the hospital he became very drowsy, and on admission was in deep coma from which he could not be aroused. Involuntary urination and defecations occurred while he was being examined, and physical examination was negative except for marked emaciation, dehydration, acetone odor to breath, respiration of sixteen to the minute, but very deep and labored. Urine showed a large trace of sugar in the catheterized specimen, and the diacetic test was markedly positive. The blood sugar was .53 per cent and the carbon dioxide combining power was 6.9 mm. of mercury. The patient was placed in bed and warmed under blankets with hot water bottles. He was catheterized and later given a soapsuds enema. Stomach lavage recovered very little, and 400 c.c. of orange juice was given by tube. Hypodermoclysis of 1,000 c.c. of normal saline followed and 400 c.c. of 5 per cent glucose was given intravenously. He was first given twenty units of iletin and four hours later twenty more. Two hours later he was given 10 units more and the patient was allowed to rest during the night. On the second day his general condition was about the same. One hundred and thirty grams of glucose was given in various forms during the day, followed with 50 units of iletin in divided doses every four hours. The next day his blood sugar was .43 per cent and the carbon dioxide combining power of his blood had risen to 17.2 mm. of mercury. On the third day the patient was able to take fluid by mouth, and he received 135 grams of carbohydrates, 10 grams of protein, and 10 grams of fat. He was allowed 40 units of iletin. His blood sugar on the fourth day was .40 per cent. The carbon dioxide combining power was 34 mm. of mercury on the fifth day. He was now mentally clear and was allowed 125 grams of carbohydrates, 50 grams of protein, and 15 grams of fat. Gradually the carbohydrate intake was restricted, being replaced by fats until a basal maintenance diet was established. On the twelfth day the carbon dioxide combining power was normal. His recovery was uneventful, and the same treatment as in the preceding cases followed.

This case illustrates the rules to be followed in the treatment of coma. The rules are as follows:

1. Absolute rest in bed under a nurse's supervision.

2. Patient to be kept warm by the use of blankets and hot water bottles.

3. Catheterization of the bladder.

4. Lavage of the stomach and introduction of glucose in the form of orange juice or glucose solution.

5. Cleansing enema of the lower bowel.

6. Administration of fluid through every possible avenue of entrance, namely, hypodermoclysis

of normal saline, and retention enema by bowel. Fluid intake and output should be measured and recorded.

7. Introduction of glucose in some form by mouth, rectum, and intravenous injection.

8. Administration of iletin subcutaneously or at times intravenously in small divided doses every four to six hours. The use of glucose and iletin should be controlled by the laboratory results on the blood and urine.

9. Treatment of cardiac complications, if they arise, by the use of some form of digitalis subcutaneously.

Sodium bicarbonate is still used by some investigators, but we have not followed it at the University Hospital. We have not found it necessary as a rule, and in the end its results are very transitory unless large amounts are used. We must also remember that after using soda our laboratory results are not a true index of the amount of acidosis which may be present.

In closing permit me to review briefly a few general rules. Our work is not finished when the acidosis and glycosuria is under control. It then falls on the physician to train the patient to care for himself after he leaves the hospital. The old routine established by Joslin is now generally used over the country. The patient must be taught to compute diets and to know the amount of carbohydrates, proteins, and fats allowed in the diet, and how to compute the caloric intake. The urine must be tested daily before the iletin injection, using Benedict's qualitative test as a rule. A quantitative test should be made frequently in order to check results. The patient must be taught to take his iletin under sterile precautions. The symptoms of hypoglycemia must be known and the necessary treatment for this condition by the use of glucose in some form, as orange juice, milk, lump sugar, or candy. The patient must know the diet to be used in case iletin is discontinued for some reason, and the care for infectious complications that may arise under iletin therapy. In the end the results of patients after leaving the hospital are indices of not only his own intelligence but of the physician's persistence and untiring effort to teach the patient all the possible knowledge he has acquired.

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There are men and classes of men that stand above the common herd, the soldier, the sailor, and the shepherd, not infrequently; the artist rarely; rarer still the clergyman; the physician almost as a rule. He is the flower of our civilization; and when that stage of man is done with and remembered only to be marveled at in history, he will be thought to have shared as little as any in the defects of the period and most notably exhibited the virtues of the race. Generosity, he has, such as is possible to those who practice an art, never to those who drive a trade; discretion, tested by a hundred secrets; tact tried in a thousand embarrassments, and what are more important, Herculean cheerfulness and courage.

—Robert Louis Stevenson.

INDICATIONS FOR THE USE OF INSULIN*

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It is evident that the program committee had a definite purpose in mind in assigning the subjects for this symposium on insulin: it was to bring before you a practical consideration of the changes it has brought about in a consideration of the pathology back of diabetes and the extensions it has provided in the way of treatment.

The first paper has already given you a clear statement of the modern dietary treatment. The third paper will discuss the gravest danger arising from the improper use of this new and powerful therapeutic agent. The final paper, discussing the emergencies arising in diabetes, will cover the very vital subject of acidosis and diabetic coma.

It will, therefore, be the writer's intention not to trespass upon these fields, but devote some time to an analysis of the classes of individuals ordinarily diagnosed diabetic; to point out particularly those in which insulin is a decisive and vital aid in treatment. Finally, to bring out enough of the scientific interest involved in an understanding of some general principles in physiology and metabolism, as to enable us to understand the great volume of current literature that is now giving us such effective directions and rules for its exhibition.

THE PROPORTION OF DIABETICS NEEDING INSULIN

Seventy-five per cent of diabetics properly diagnosed do not need insulin routinely.

1. Of this group the largest number comprise the atherosclerotic or "aging" group—either senile or presenile—and accordingly, range in age from fifty to seventy years. It must be definitely stated, however, that while this group can, as a rule, be properly safeguarded as far as carbohydrate metabolism is concerned by conservative dietary measures, they may at any time come into condition where insulin is a very great aid. We need only briefly mention here the well known states dependent upon acute infection,[1] furunculosis, necessary surgical operations, persistent dermatitis or vulvitis, and a great many other troublesome disorders vitally interfering with sleep and digestion, not to say peaceful, happy life.

This group clearly borders upon the infectious pancreatitis group, known to be associated with acute and chronic infections of the biliary tract—a very excellent field for surgery. However, after all is accomplished that surgery can do, these patients rarely lose all their glycosuric tendencies and take on the attributes of either the vascular or the obese groups.

It must be fully remembered that as these atherosclerotics continue with their advanced, widely distributed degenerative body processes, they enter gradually upon conditions of decline closely simulating a general acidosis. It will be found that it is too much to expect that the late administration of insulin to these patients will restore much bodily function where the process is already greatly advanced. In other words, it is likely that the degenerative process, as far as the Islands of Langerhans are concerned, is as patchy and incomplete as applied to the pancreas, as it is to other organs, such, for example, as the kidney.

It should be remarked that no single patient in this very large group of so-called diabetics should go without the most careful understanding incident upon a thoroughgoing examination of the *objective evidences* substantiating a diagnosis of arteriosclerosis, or, to use a better word, atherosclerosis. This includes particularly a careful study of the eyegrounds and the peripheral arteries; of course, an estimate of the myocardium and the probable coronary circulation; attention to obscure signs of intermittent claudication; finally, a due consideration of the changes incident to widespread sclerosis of the brain and cord.

2. The next important subdivision in this group concerns the so-called "obese" diabetics. It is quite certain here that insulin need only be considered for intercurrent conditions or complications. We should also recall that the obese patient has available a very considerable depot of fat, and in determining anti-ketogenic and ketogenic relationships the amount of fat fed should be correspondingly less.

3. The variety of indefinite endocrine disturbances, the result of probable polyglandular perversion, in which the pituitary and thyroid glands stand out conspicuously. Pregnancy introduces a complicating and stimulating factor at times important. For the purposes of this discussion little need be said, because the group is small and the classical picture of diabetes is rarely even approached.

*Read in symposium before the Annual Meeting of the Minnesota State Medical Association, St. Paul, October, 1923.

4. We may take the same attitude toward the glycosurias incident to cranial injury or cerebral neoplasms, except that the relationship between brain injury and the development of the true picture of diabetes is still much discussed and probably does exist.

5. Finally, renal diabetes must be considered only to point out that it has no connection with pancreatic failure, and therefore does not concern the use of insulin. A word of caution is necessary, however, not to overdiagnose this interesting but rare condition. Unless the fullest of safeguards are put about the diagnosis it is apt to include other conditions, notably the early atherosclerotic type.

THE SEVERER GRADES OF DIABETES

The remaining 25 per cent of severer grades of diabetes have much to hope for from the use of insulin. This concerns the very vital juvenile and early diabetics. It includes any diabetic who is to be operated upon; naturally, any diabetic with an infectious or acidotic complication, and possibly also any diabetic headed toward severe trophic disorder like gangrene or cataract.

First of all, the investigations and studies incident to the isolation of insulin and a development of its properties, establish convincingly the contention, long conjectured, that the disease is due to a failure of function on the part of the Islands of Langerhans.

It can be safely predicted that its use will become more and more extended to those chronic cases, even of milder severity, because the simple fact back of its use, which justifies the greatest hope from its use, lies in the principle of resting overworked, underproducing Langerhans Islands. That was the basis back of our previous treatment for diabetes that was any good. Insulin treatment has not displaced dietary regime; it has simply elevated the dietary treatment to a fixed position, and without it *insulin cannot be used.*

HISTORICAL CONSIDERATIONS

Previous to Allen's regime of food restriction, the old treatment of diabetes, which would simply direct the patient to cut down on the intake of sugars and starches, was absolutely hopeless:

1. It did not consider at all the basal maintenance needs of the body nor much concern itself with the body activities of the patient.

2. Protein was fed indiscriminately, without any particular idea as to the basal needs (two-thirds gram for each kilogram of body weight). Not only was the intake of protein apt to greatly tax the body, but it did not consider the fact that 58 per cent of this foodstuff was available to the patient in the form of glucose.

3. In addition, it was not understood or considered that 10 per cent of the fat (glycerol-Woodyatt) was likewise available as carbohydrate.

Then, with the thoroughly scientific regime as outlined by Joslyn, Allen and others, the diabetic was made quite safe, and the overtaxed pancreas, like the overworked myocardium, under the influence of rest attained a certain degree of better function. But, for many individuals, this meant a life of such restriction of energy output as to make it quite impossible for them to carry on or make a living. With fat yielding 9 calories per gram on combustion, to 4 each for either protein or carbohydrate, it was inevitable to attempt the highest possible utilization of fat in providing not only a maintenance body diet but something to work on. Hence, the so-called "high fat" diet as outlined by Newburgh, Marsh, Woodyatt, Wilder and others. The very evident advantage of the fat if excessive ketogenic factors could be obviated was self-evident. Nevertheless, this apparent difference of opinion among accepted authorities was not a little disconcerting to the ordinary practitioner handling diabetics. Therefore, one of the very greatest benefits accruing to the profession from the discovery of insulin is the clarifying of the atmosphere and making certain things quite clear. For purposes of brevity some of these are being summarized:

1. Diabetes is not a disease due to the inability of the tissues to utilize any kind of carbohydrate.*

2. It is due to a failure of the Islands of Langerhans to discharge into the circulation a hormone, and therefore the pathological disorder back of diabetes does reside in that portion of the pancreas.

3. This hormone does not primarily incite or stimulate directly the burning of carbohydrates (Boothby and Wilder[2]), but simply changes the structural formula of glucose in such a manner as to activate it and make it available as a source of combustion or glycogenic storage. One definite proof of this is seen in the fact that it does elevate the respiratory quotient.

A unit of iletin as now manufactured by Lilly

*It is astounding to note how rapidly the literature has swung about from that long-held hypothesis.

& Co. may be depended upon to prepare for utilization 1.5 to 2.5 grams of carbohydrate.

4. Fat is always burned in the body "in the flame produced by the burning of carbohydrates." This was clearly known before but never in the dynamic or dramatic definiteness that the use of insulin has established.

5. Where the proper relationship between the carbohydrate and the fat is not properly maintained the body carburetor cannot function, and the accumulated soot of improper consumption is made up of the ketone bodies—acetone, diacetic acid and beta oxybutyric acid—and an acidosis results.

6. The Toronto committee[3] advised that it is fair to assume that carbohydrates, properly available, will burn fat in the proportion of one to two. Recently, Ladd and Palmer[4] claim that an entirely safe ketogenic relationship ensues both in the normal as well as the diabetic individual where the ratio of one to four is maintained.

7. If one understands reasonably well the ordinary dietetic treatment of diabetes, an understanding of these simple principles will render the use of insulin comparatively easy. It will require no more accuracy than that needed in the digitalization of a case of chronic myocarditis with auricular fibrillation. The present situation is an excellent time to develop a plea for accuracy and a little general mental concentration.

Von Mering and Minkowski, over thirty years ago, gave the lead that unerringly developed this triumphal product of research genius.

We are witnessing this triumph in the isolation of insulin, the result of care and accuracy in the use of *an old method* of alcoholic extraction of the active principle from the glands of internal secretion. We should be willing to meet this by an accuracy of our own. Certainly no hesitating public, as met Jenner with his eliminator of smallpox, awaits us; on the contrary, hordes bare the arm for almost any kind of injection (Loeffler's intravenous included).

The dosages of antitoxins, serums and vaccines, have been as grotesquely indefinite as the dosage of whisky. Likewise, endocrine tablets and their multi-varied combinations have been about as direct as if, in their use, a hunter threw his ammunition at his quarry—he might better remain in his caveman realm and hurl a sharp stone instead.

No method of the oral administration of insulin has so far been accepted, yet drug houses send their salesmen back and forth across the entire country lustily discussing how their particular company, by superior judgment and skill, is able to extract the pancreatic hormone and combine it variously, stressing their arguments for its supposed benefit by the flimsiest of clinical reports. Why, gentlemen, do we tolerate this sort of thing at the very time when we have before us the dignified attitude of Banting and Best and their co-workers, together with the very ethical and helpful attitude of the American manufacturer of iletin?

It is a most wholesome mental pursuit for all of us to review the present literature on insulin. It helps to remove the cobwebs and dust from our understanding of certain simple physiological processes, and gives us a great variety of surprises and pleasures secondarily.

Just to illustrate one of the many: Crile has long pounded in the idea that a proper glycogenic storage in the liver is a great safeguard for the operative patient. He has elevated the much despised and contumeliously regarded organ to that position where it stands as the great stabilizer even of the nervous system. Now, observe in the literature on the use of insulin just prior to operation, that it is advised that the customary intake of glucose is probably not necessary because the shock incident to the operation will let free sufficient adrenalin to mobilize plenty of the glycogen in the liver to balance combustion properly! This is only a passing instance, of which there are many.

Finally, every patient using insulin in more than temporary periods must come to know the rationale of its use. Hence, the wonderful lead of Joslyn must be followed up. The physician must teach, and if he is to teach he must know. Classes in association with hospitals or clinics are unquestionably most potent factors, and the grouping of these patients has many advantages. Ultimately, a lot of diabetes must be prevented by instruction that will induce those with congenitally weak pancreases to watch their step, dietetically speaking.

THE GENERAL ADOPTION OF THE METHOD OF INSULIN TREATMENT

The new departure in the matter of giving to the profession the results of this most valuable piece of research has been given much and very favorable consideration. Thanks to the liberal attitude of the American manufacturer, the product known as iletin has been available to research and teaching institutions just as soon as its supply was sufficient.

In fact, few medical centers have been without it where its use in emergencies demanded it. As a result, convincing and authoritative reports and discussions have come into the literature freely, and are now available, and in this productive field, we in Minnesota may take full pride in the fine series of articles that have come from the metabolism wards and laboratories of the Mayo Clinic.

It is obviously impossible for you to listen to a discussion such as this and carry away much more than an incentive to ferret out the details. I urge those of you who are interested to go directly to the numerous splendid articles now in the journals[5] or in pamphlet form. Read as an introduction the special article by the Toronto committee[3] in the Journal of the American Medical Association. Read the Mayo Clinic[6] number of the Medical Clinics of North America for July, 1923. Study carefully Wilder's nomographic chart, especially as modified by his associate Adams. The September journal of this association—MINNESOTA MEDICINE—in an article by Wilder,[7] again puts in very usable form an immediate diet for those threatened with diabetic acidosis.

Gentlemen, insulin is ready for us; let us make ourselves ready to properly dispense it. The future will probably greatly expand the field for its usage. It is not impossible that it may include in some measure metabolic complications such as non-diabetic acidosis. Our private and hospital laboratories should, of course, be equipped to handle the ordinary routine laboratory tests necessary to complement the work of the clinician in these various fields as they are developed.

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"PEACE ON EARTH, GOOD WILL TOWARD MEN"

As this is the celebration of the birth of The Great Physician, it behooves each and every one of us to examine the trend of our own life and square it up with the life of him who, through the whole course of his service to mankind, never once faltered in his duty to humanity, and finally gave his life blood that we might see more clearly what true service means.

In our mad rush for financial independence, do we not often forget the nobility of our profession, and have we not ourselves been partly responsible for the lack of respect and the lack of confidence which the public in general has shown toward the medical profession during the past fifteen years? Medicine is one of the oldest of the professions, and the medical man should be the leader in every community to which he administers the healing art. Let us rise up, then, in our might and be the true leaders in our respective communities on all questions pertaining to health and sanitation. Why should laymen usurp our prerogative of leadership in the one subject in which we are experts?

A labor union is all right in its place and has done a great work in bettering the workmen's condition, but, can any one imagine the staff of Cook County Hospital or the Dunning Institution going out on strike for any reason whatsoever, and allowing the poor human beings under their professional care to suffer and die because of a few paltry dollars? Never! Or can you imagine our city or state health officers leaving their posts of duty while an epidemic was raging? It never has been heard of and never will. It is, therefore, one of the distinguishing differences between our profession and a so-called union.

We may play with politics for a time and accomplish some of the things which are necessary for our economic welfare if we happen to be on the winning side, but the past ten or twelve years have proved to the medical profession of Cook County, at least, that politicians will promise anything before election and shut the door in our faces thereafter.

No, sir, we can never become a labor union, or a political party, nor can we become affiliated with them, in fact, and the sooner the medical profession realize this, the sooner they will become the real leaders in all questions pertaining to health and sanitation, and the sooner we will be given the honor and respect that was once ours without question.

As the New Year opens, let us be governed by the example of the Great Teacher and Physician when he said:

"Inasmuch as ye have done it unto one of the least of these, ye have done it unto me."—*Bulletin of Chicago Medical Society.*

HYPOGLYCEMIA*

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The observation that a condition of hypoglycemia can be produced in a normal animal (rabbit) by the subcutaneous administration of an extract of pancreas containing the active principle was first made by the writer in December, 1921, shortly after he became a co-worker of Banting, Best and MacLeod. It was due more to this observation than to any other single factor that the writer was enabled in a few weeks' time to isolate the active principle of the pancreas in a sufficiently pure and stable form to allow of continuous administration of the same to the human subject. The rabbit test also served as a means of assay of the first insulin used in the treatment of human diabetic subjects. The unit which was first used in this connection was the amount of extract which would produce a 50 per cent decrease in the blood sugar level of a 2 kilogram rabbit. It was later discovered that normal rabbits manifest typical symptoms when the blood sugar has fallen to a level of approximately 0.045 per cent. It was also noted at the same time that animals having such a severe insulin reaction could be recovered within a few minutes by the use of glucose. Adrenalin was also shown to have a beneficial effect on this condition. The physiological unit which was later adopted was the amount of insulin which would produce convulsions in a 2 kilogram rabbit. The clinical unit now in use is approximately one-third of the original physiological unit.

It is very significant that the observations of the effect of insulin on normal rabbits above mentioned which contributed very largely to the successful development of insulin are also essential facts which must be fully appreciated by all who are to use the pancreatic hormone in clinical practice.

There would seem to be no essential difference between the state of profound hypoglycemia which can be produced in a normal animal by adequate insulin dosage and the similar state which is sometimes produced in a diabetic subject by insulin overdosage.

The primary effect of the administration of insulin to either a normal or a diabetic subject is to cause a fall in the level of blood sugar. What the exact nature of this primary effect may be is not yet fully understood. It has been well established that glycogen synthesis takes place in the liver of a diabetic dog under the influence of insulin. It may be possible therefore that sugar storage in the form of glycogen may account entirely for the decrease in blood sugar level of both normal and diabetic animals which have received insulin.

It is a noteworthy fact, however, that the liver of a normal rabbit which has manifested a hypoglycemic reaction following insulin administration may on occasion be found to be practically free of glycogen. Mann[1] has also very definitely shown that the liver is non-essential to the production of the hypoglycemic reaction by insulin. There are factors, therefore, other than glycogenesis which may account for the disappearance of sugar from the blood of insulinated individuals. Best and Hepburn early demonstrated that the respiratory quotient rose in diabetic subjects within a few hours after the injection of insulin, and shortly before this the writer had shown that ketosis could be abolished in depancreated dogs by the use of the pancreatic hormone. These two observations indicate that glucose burns freely in the tissues of insulinated diabetic individuals. It is herein that the chief value of insulin lies. The tissues of the insulinated diabetic subject are enabled to utilize glucose and thereby are capable of burning fatty acids to the normal end products CO_2 and H_2O without the accumulation of ketone bodies. Normal metabolism therefore ensues and acidosis is abolished.

When as a result of insulin overdosage, the blood sugar has fallen to a very low level, an unphysiological state is produced and a typical train of symptoms ensues. Almost immediate recovery from the hypoglycemic symptoms can be effected if the level of blood sugar is suddenly raised as by the administration of glucose. It is of interest in this connection to note that there is a certain amount of evidence that a spontaneous effort is made to raise the blood sugar level in the hypoglycemic state through the discharge of adrenalin from the supra-renal glands.[2] On occasion we have noted a pilo-motor effect in rabbits in a condition of hypoglycemia. If the dose of insulin administered is just sufficient to produce convulsions in an

*Presented in symposium at the Annual Meeting of the Minnesota State Medical Society, St. Paul, October 11, 1923.

experimental animal, spontaneous recovery may occur. The end result of insulin overdosage is, as a rule, death unless recovery is effected through the administration of glucose. If a condition of profound hypoglycemia is maintained for some hours before glucose is administered, the effect of the latter may not be so striking. Complete recovery may not occur for some time. In other words, the maintenance for any length of time of this unphysiological state of profound hypoglycemia may result in the production of changes which are to a degree irreversible. There is a probable analogy here between the coma of long duration in the diabetic and the coma of profound hypoglycemia.

Theoretically, recuperation of the insular tissue of a diabetic and thereby increase in native tolerance for carbohydrate is most likely to occur if the blood sugar be kept within or even slightly under normal limits by adequate insulin therapy and a proper dietetic regime. In this, the most scientific type of insulin therapy, there is always the constant danger of the hypoglycemic reaction. Practically, therefore, if such a reaction be met with it should be counteracted at once.

The nearest parallel to the hypoglycemic reaction observed following insulin administration is the condition of hypoglycemia described by Mann[3] as observed by him on deliverized dogs. Mann has shown that following complete removal of the liver the level of blood sugar falls gradually and progressively, that typical symptoms occur when a certain low level is reached and that temporary recovery is effected by glucose administration. Mann found, however, that these deliverized animals though benefited for some hours by glucose administration ultimately died in spite of the sugar injections. These results demonstrate that the liver plays a very essential part in the regulation of blood sugar level.

The mechanism for the regulation of blood sugar concentration in the normal animal is in all probability a very complex affair. Such factors as the normal functioning of the pituitary, pancreatic and suprarenal glands and liver together with the actual metabolic needs and the concentration of blood sugar itself must all form integral parts of this regulatory mechanism. When in experimental work, therefore, a marked deviation from normal blood sugar standards is noted, it is not always a simple task to determine just what part of the normal mechanism has been thrown out of gear, so to speak.

As soon as it had been established that the functions of sugar storage and sugar combustion in the animal were dependent upon insulin activity, the writer felt that in all probability further research would disclose the existence of an insulin-like substance in the vegetable kingdom, since plants are sugar burners. It was later shown[4] that extracts made from a variety of plant sources may produce hypoglycemia when injected into normal rabbits, or a very definite lowering of the blood sugar of depancreatized dogs. It was noted, however, that whereas the administration of insulin is followed by a prompt fall in blood sugar, the fall in blood sugar which occurred following the administration of plant extracts did not take place till some hours or, in certain instances, some days following the administration of the extract. The effect of injected plant extracts was therefore quite distinct from the effect of insulin.

It was later observed[5] when a condition of profound hypoglycemia had developed in a normal rabbit following the administration of a plant extract, that the injection of a small amount of blood of such an animal into another normal rabbit produced in the latter animal a condition of hypoglycemia. The hypoglycemic reaction developed in the second animal usually within a day. It was also found that such animals could be temporarily recovered from the hypoglycemic state by the injection of glucose. The condition of profound hypoglycemia continued to recur even after glucose administration and the animals would as a general rule ultimately die. The blood of such animals would, however, produce similar effects when injected into other normal animals. Blood passage of this effect could be carried on successfully to an indefinite extent. When this phenomenon was first observed it was thought that an organism might be the underlying cause. This possibility was excluded, however, when it was shown that such a potent blood was still active after autoclaving.[6]

It has since been shown that a similar result can be obtained with the blood of insulinated rabbits. It is necessary to give a large overdose of insulin and to keep the injected animal in a condition of profound hypoglycemia for many hours. The blood of the insulinated rabbit has then produced

hypoglycemia when injected into other normal rabbits.

Spontaneous hypoglycemia may be noted on occasion in certain individuals in a rabbit colony. The liver in all such cases observed by us has been found to be full of cysts, and coccidia oveforme have been demonstrated on microscopic examination. The blood of such an animal will likewise produce hypoglycemia when injected into other normal rabbits.

Recently we have been able to show that prolonged starvation of rabbits results in the manifestation of profound hypoglycemia just prior to death. The blood of these animals will also produce hypoglycemia if injected into other normal rabbits.

The subcutaneous injection of certain guanidine compounds may also result in the manifestation of profound hypoglycemia. The blood of guanidinized animals under these circumstances has also been observed to produce hypoglycemia when injected into normal rabbits.

I have recently obtained through the kindness of Dr. Mann, of the Mayo Clinic, a sample of blood from one of his deliverized dogs. The injection of this blood into rabbits was followed by the manifestation of hypoglycemia.

The production of the hypoglycemic state by any of the methods above described stands in sharp contrast to the typical insulin reaction. The insulin reaction is manifested within a few hours of the time of the injection whereas the hypoglycemic reaction otherwise produced develops much more slowly. The phenomenon of "delayed action" can also be seen after the administration of pancreatic extracts which have been kept slightly alkaline throughout their preparation.

As hypoglycemia can be produced in such a variety of ways, one is led to ask this question: "Is there some fundamental similarity in the mode of activity of these various agents, insulin included, or is it merely chance parallelism which we are dealing with?"

It is conceivable that liver injury might explain all of these results. Further research only can settle the issue, meanwhile I present the results for what they are worth.

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FROM A COMMITTEE REPORT OF SEVENTY-FIVE YEARS AGO

It is in vain to attempt the enforcement of any direct legal restrictions upon the people in regard to medicine; if they choose quacks and quackery, no law which would forbid such choice can stand in this country.

That there should be some laws in relation to the medical profession there is no question. But the ideas which are commonly entertained in regard to the scope and object of these laws are somewhat indefinite even among medical men. In the opinion of the committee, the object of these laws should be simply this—*to give protection to those measures which are calculated to secure to the community a well-educated body of physicians.* Everything inconsistent with the attainment of this object should be discarded. No class of physicians, professedly and exclusively devoted to any system of opinions and practice, should as such receive such protection. The medical profession should be a single body of men without any prescribed set of opinions. And the ground of admission to their ranks should have no reference to opinions; but there should be the greatest latitude in this respect. Character and education should furnish the only basis of membership.

We are persuaded that, if the profession as a whole should take this view of the subject, we should stand in a much better position before the public than we now do. We should then be able to propose to the community the question, clean and stripped of all incidental and embarrassing considerations, whether they would sustain an educated or an uneducated profession. We should stand simply and clearly upon our merits in this respect, and should command the respect and confidence of the great majority of the community. But whenever other grounds are taken and opinions are made in any degree the basis of admission or expulsion, we lose this respect and confidence, for we enter into competition with opinionists of every grade, and upon their own level. At this moment, the strife between the regular profession and other self-constituted medical bodies is regarded by even sensible men in the community as being for the most part a war of opinions. And some ground is given them for this view of the subject by occasional acts by individuals, or even by some of our associations.—A. M. A. Bulletin, Nov., 1923.

THE TREATMENT OF THE EMERGENCIES OF DIABETES*

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There is little reason to believe that insulin will materially affect the underlying metabolic fault in diabetes. In fact, it is possible, as certain observers maintain, that the better nutrition which the use of insulin permits, may hasten the progress of the underlying disease more than formerly under régimes of undernutrition. Instances of improvement in tolerance following the institution of insulin treatment in the Clinic have been observed and commented on, but the patients either had the chronic type of diabetes, or were in an early stage of the acute and inherently progressive disease. The severest cases have not shown such improvement; a few of our patients are now requiring larger doses than they did a year ago, and one of the children seems to be reaching a stage of complete dependence on insulin. It is highly probable, therefore, that the patients with the acute type of diabetes will, in a few years, lose all their native tolerance and become completely diabetic. I wish to emphasize this probability, first, because of the necessity of envisaging the prospect of having gradually to increase the present daily dose of insulin, and second, because of the importance of insuring an uninterrupted supply of insulin in cases of complete diabetes. When patients have been kept alive by insulin long enough for their native tolerance to evaporate completely, their diabetes will be complete or total, such as has never been encountered in the past, and if, therefore, they are deprived of their quotidian injections, for ever so short a time, acidosis will develop with remarkable rapidity, and neither fasting nor careful dieting will avail to protect them. Their metabolism will consist exclusively of the ketogenic acids, regardless of their diet. No glucose will be available, and 100 or more grams of aceto-acetic acid will accumulate daily. A hypothetic example may throw light on the amount of insulin which will ultimately be necessary to keep such patients alive.

From available data on the energy exchange of normal resting individuals, it may be calculated that a man, thirty years of age, 5 feet 10 inches in height, and weighing 150 pounds, will generate approximately 1,700 calories a day. With no energy derivable from glucose, this heat must all be supplied by ketogenic acids, and the amount of these in terms of fat would total about 180 gm. According to prevailing views, such an amount of fatty acid would necessitate at least 56 gm. of oxidizing glucose, if acidosis is to be avoided. It might be estimated, therefore, assuming that a unit of insulin will accomplish the metabolism of 1.5 gm. of glucose, that 37 units of insulin would be necessary daily. The unit of insulin, however, may not have such potency under these conditions. The method of assaying insulin clinically, which gave the average figure stated, was proposed chiefly as a means of comparing the strength of one lot of insulin with another, and it is obvious that the figure can be obtained only under the condition imposed for the clinical assay.[1] Infections and other complications, as well as nervous influences and probably severe acidosis itself, may be expected to affect it unfavorably, and, in the assay proposed, only those patients were selected for the test who were "free from infections or other complications and comparatively calm in temperament."

It is not unlikely that the hypothetic patient under discussion would require at least 1 unit of insulin for each necessary gram of sugar, and this would make his minimal daily insulin requirement 56 units. Furthermore, these are figures for a person at rest. If the hypothetic patient is to carry on a gainful occupation, and is to be given sufficient food to supply the energy for such work, the requirement will be still greater. Thus, we have found it desirable, in order to plan satisfactory large diets that are palatable, to establish a tolerance for at least 100 gm. of glucose, which might necessitate the injection of 100 units daily.*

As a matter of fact, one of our patients, D. D. (Case A386254), a child now three years old, has recently required 60 units of insulin daily with a food allowance of carbohydrate 50, protein 50, fat 100. As was reported previously, this same child developed severe insulin shock a year ago with only 12 units. There may be undiscovered infection complicating the case at present, but a

*Read in symposium before the Minnesota State Medical Association meeting, St. Paul, October 10-12, 1923.

*All references to insulin dosage in this paper are based on the original "iletin" unit of the Eli Lilly Company, namely their "H-20" material.

great decline in tolerance seems to have occurred during the year. The insulin dosage has been raised gradually. With 60 units of insulin a day the child is apparently normal. With a smaller dose he develops acidosis at once.

To most of the patients treated thus far, it has been possible to give insulin in a single dose daily, or in two doses; this is naturally preferable to more frequent injections. However, it is probable that, as the patient advances toward a state of complete diabetes, it will be necessary to increase the frequency of insulin injections in order to shorten the interval between doses. The child, D. D., is receiving 60 units in three doses, 25 units before breakfast, 20 at 2 P. M., and 15 at 8 P. M. We have now used insulin in the treatment of 370 patients, of whom 181 are continuing its use in their homes. These patients have received a fair training in dietetics, and have been advised with regard to the necessary dose of insulin. They are weighing their diets and taking regularly from 15 to 45 or more units of insulin daily. The greater number of these patients are strong, and able to engage in their normal work. Disaster, however, has overtaken a few of them, and I anticipate that as the others more closely approach the state of total diabetes, disaster will become more common. A few patients have failed to receive their allotments of insulin. For the most part, they have been supplied through their home physician, the material being mailed to the physician by the manufacturers. Occasional slips have occurred through loss or damage of the material in the mail. All of the patients have been carefully instructed, both while they were in the hospital and subsequently by correspondence, to insure themselves against such accidents by always keeping on hand at least one extra month's supply of insulin. In spite of such warnings, patients occasionally find themselves without insulin. In one case death in diabetic coma resulted within thirty-six hours after the injections were discontinued, and at least three patients have returned for treatment just in time to avoid a similar catastrophe.

The danger to the patient with complete or nearly complete diabetes from missing an injection imposes the enormous responsibility on everyone concerned with the use of insulin, of seeing that patients receive their injections of an insulin of satisfactory potency regularly and without fail. I feel sure that the members of the Eli Lilly Company fully appreciate their responsibility, and are making every effort to maintain the product at a standard strength. I regret that I have less confidence in the patient's physician and in the patient. Certain patients will forget about their reserve of insulin, others will be persuaded to try some of the many other pancreatic preparations on the market, with results that must inevitably prove tragic.

Acidosis and coma, if the patient is conscientious and well-trained, are almost always invoked by some complicating infection or infectious disease. Anesthetics and surgical procedures do, it is true, precipitate acidosis and confront us with a similar problem. A careless, ignorant, or willful patient may, through dietary indiscretion, promptly develop diabetic coma, but the fate of such a patient is less disastrous than that of the conscientious and intelligent patient who is suddenly stricken with pneumonia, typhoid fever or measles. It is to the management of such infectious complications that I wish especially to call attention.

THE MANAGEMENT OF INFECTIOUS COMPLICATIONS

The influence of the infections on the metabolism of the diabetic patient is a subject deserving further study. An immediate break in tolerance is produced which usually results promptly in acidosis, and unless suitable measures are instituted to combat the accumulation of acetone bodies, the outcome is almost certain to be coma and death.

Whatever the mechanism involved, the facts are that a patient with partial diabetes may be suddenly converted by infectious processes into one with total diabetes, and during the continuance of the infection, doses of insulin as large as, or larger than those computed for patients with total diabetes may become necessary immediately and continue necessary until the complicating infection subsides. It has been difficult sufficiently to impress patients and physicians with the necessity for heroic use of insulin in such emergencies. So much has been written concerning the danger of the insulin reaction, or insulin shock, as we prefer to call it, and of the necessity of balancing the insulin dose with the food, that a certain timidity has been engendered. For example, a patient who is doing well on a certain dose of insulin and a definite, properly calculated and weighed diet develops an infectious complication. His appetite fails, and he

or his physician thinks that, since he cannot eat, the dose of insulin should be reduced. Metabolism, however, does not stop by reducing the diet; it may, in fact, be increased by the fever, and the insulin, even in the absence of food, may have a much feebler action than usual, as the result of the deadening effect on it of bacterial toxins. The consequence of reducing insulin dosage under such circumstances is the rapid development of acidosis, and the precipitation of coma. One child was rushed back to the Clinic in coma as the result of such a mistake.

It cannot be too strongly emphasized that the advent of an infection always demands not less, but more insulin, and that large doses of from 15 to 25 units, may be needed every six hours, so long as the infection continues. As in the case of uncomplicated but total diabetes, the interval between doses must be brief, and the daily dose must be divided and administered in three or four equally spaced injections.

It is important to use carbohydrate fairly liberally. Fruit juices are well tolerated, and contain sugar in an especially available form, in large part as fructose. It is considered that orange juice contains ten parts of carbohydrate. We make it a rule to administer by mouth 100 gm. of orange juice with every 20 units of insulin injected, and have found that in toxic cases this amount of carbohydrate will satisfactorily buffer the insulin and at the same time supply the sugar necessary to counteract ketosis. Besides the carbohydrate of the orange juice, such soft foods as the patient will accept, especially milk, cream and eggs, are given. However, the total carbohydrate ingestion should not exceed 100 gm. daily. It does not seem necessary or desirable completely to avoid glycosuria at such times; the control of acidosis is primary. Every effort is made to prevent the accumulation of acetone bodies.

Despite fairly large doses of insulin and adequate carbohydrate, an exacerbation of the infectious process may at any time provoke sudden acidosis. It is, of course, extremely helpful to have at hand the laboratory facilities for examining the blood for the carbon dioxid capacity of the plasma, but in the absence of such facilities, the respiration of the patient is a reliable indication of the state of the alkali reserves. Air hunger, the long deep "Kussmaul" type of respiration, is a sure sign that the stores of alkali are depleted, and such breathing, if accompanied by a strong acetone smell and other definite clinical evidence of acidosis, is an indication for giving soda. The disrepute into which sodium bicarbonate has fallen is undeserved. An intravenous injection of 500 c.c. of a 6 per cent sodium bicarbonate solution will immediately affect a critical acidosis, and to neglect its use in such an emergency is unjustified. Insulin and carbohydrate may accomplish the same result as soda, but the delay entailed may tip the balance unfavorably. Severe diabetic acidosis is dangerous, and should be controlled as rapidly as possible.

When the infection subsides, the patient's native tolerance, which has been temporarily suppressed, returns in part at least, and the necessity for large insulin doses passes. It is then important to reduce these doses in order to avoid overaction and insulin shock. It is usually possible to return gradually to the diet and dosage which were effective before the onset of the complication.

It has been necessary to combat a number of very severe infections in the large number of diabetic patients observed in our wards during the year, and by carrying out the general principles discussed, the mortality has been kept very low.

SUMMARY

Use enough insulin to control acidosis. This may require from 60 to 100 units daily, and should be given in equally divided doses at six-hour intervals.

Administer by mouth 100 gm. orange juice with every 20 units of insulin injected.

Watch the breath for the odor of acteone; examine every voiding of urine for diacetic acid. If possible, and if doubt exists, obtain the carbon-dioxid capacity of the plasma. If signs of severe acidosis develop, the Kussmaul type of respiration or a carbon-dioxide plasma capacity below 20 volumes per cent, use sodium bicarbonate as a 6 per cent solution intravenously, giving 500 c.c., and repeating this injection if necessary.

Reduce the dose of insulin and readjust the diet when the complication has passed.

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THE EAR IN GENERAL MEDICAL DIAGNOSIS*

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In the practice of medicine at the present time very complex problems in diagnosis are dealt with. Such a state of affairs has naturally led physicians to a more intensive study of conditions affecting certain organs, or groups of organs. The fact is sometimes lost sight of that symptoms referable to certain regions may be due to disease conditions in a distant part, or at least a part quite removed from the site of the original complaint. Recognition of this phenomenon is the function of the diagnostician. The otologist is expected by the state boards of medical examiners to be able satisfactorily to examine the chest, abdomen, and central nervous system, to interpret laboratory findings, and so forth; in other words, to have at least a good general understanding of the general physiology of the body. The tendency is quite prevalent, among general diagnosticians, to relegate to the otologist all patients with symptoms referable to the mechanism of the ear, although in the successful management of many such cases the services of the internist are indispensable. A better general understanding of the symptoms related to the ear referable to certain deranged conditions of other parts of the body would be of great advantage to many internists. Examination of the eye is resorted to for confirmatory evidence by many internists in certain types of cases. It must be borne in mind that each organ forms an integral part of the complex whole.

Physicians, on final analysis, are more or less familiar with many of the causative factors of symptoms related to the ear, but forget that they know about them. I shall mention here some of the more common general conditions which may affect the mechanism of the ear for the sole purpose of recalling them to memory. The symptoms which may attract the patient's attention to this mechanism may be classified in three main groups: tinnitus aurium, deafness, and pain. Vertigo and its sequelae, nausea and vomiting, are not generally regarded as symptoms due to disorders of the ear.

*Read before the Minnesota State Medical Association, St. Paul, October 10-12, 1923.

TINNITUS AURIUM

The actual causal factor of tinnitus, even the histologic and pathologic factor, is very difficult to determine. Tinnitus may be caused by local conditions within the mechanism of the ear, but very often it is caused by quite remote conditions. When one recalls that the arteries supplying the ear are end arteries as demonstrated by Shambaugh, and that the internal carotid and internal jugular vein are separated by only a thin plate of bone, one can easily understand how changes in the nervous mechanism controlling the caliber of the blood vessels might readily have a very definite effect. It may be said in general, I believe, that tinnitus is caused by some disturbance of the local circulation. It is also true that there is a more or less constant tinnitus in normal persons, but this is disregarded. Anyone, when tired, may sit quietly, and by merely listening will notice tinnitus.

One would expect that, in cardiovascular disease, tinnitus might be a common symptom, and this is the clinical experience of most otologists. Obviously, the treatment is not local. Occasionally the patient is terribly distressed, and not infrequently has a suicidal tendency. The patient's particular fear is that the tinnitus may be a precursor of oncoming deafness, but this does not necessarily follow.

Tinnitus in some form is usually associated with arteriosclerosis of the central nervous system type, and may be very severe. Patients with high blood pressure, originating in organic disease in contradistinction to the essential hypertension type, may manifest tinnitus as one of the early symptoms. In cases of the blood dyscrasias, the leukemias, polyemia, anemias and polycythemia, tinnitus and deafness are associated symptoms because of the plugging and congestion of the small end vessels. Occasionally, in valvular diseases of the heart, the bruit may be heard by the examiner. I have examined three such cases. Pelvic and abdominal disorders, as described by Woakes, are a well recognized cause of tinnitus. In early stages of pregnancy tinnitus may be a prominent symptom. Tinnitus has also been observed repeatedly at the Clinic in both pre-operative and postoperative abdominal cases. In fact, two very definite instances of patients complaining of tinnitus were found, on general examination, to have uterine fibromas, and their removal relieved the tinnitus. Postoperative tinnitus is a rather difficult symptom for the general

surgeon to explain unless it is recalled that the nerves controlling the caliber of the vertebral arteries, and also the basilar artery and its branches, including the internal auditory, which supplies the labyrinth, come from the inferior cervical ganglion. The stomach and other abdominal viscera are largely supplied by the pneumogastric nerves, and the communication between the vagus and the inferior cervical ganglion is established by means of a fasciculus from the vagus to the inferior cervical ganglion.

Because of the injurious effect on the mechanism of the ear, constipation and gastro-intestinal stasis are more important factors than is generally recognized. A fair majority of deaf persons, particularly women, are constipated and often obstipated. The effect may be vascular and toxic. There are many other less common toxic factors. Focal infection may play its part in the same way. The effect that quinin, salicylic acid, and other drugs may have on the ear is well recognized.

Disturbances of metabolism, myxedema and its allied conditions, often present symptoms referable to the ear. The effect probably is secondary to the changes in the blood vessels and perhaps in the concomitant tissue changes. In a study of the mechanism of the ear in cases of myxedema, it was found that both the cochlear and vestibular branches of the eighth nerve might be involved. The function was usually below normal, in certain cases considerably below. It has been apparent that the state of health is an important factor in the condition of this special sense nerve.

Neurasthenia and allied disorders are the most common general and functional conditions which may have concomitant symptoms related to the ear, and it is in such cases that the otologist has the most difficulty in satisfactorily explaining symptoms to patients. Local treatment per se will not relieve the symptoms. In the syndrome of an acusticus neuroma, Cushing has shown that tinnitus is the prodromal symptom. Tinnitus, deafness, and vertigo may be the early symptoms of many complex cases of intracranial tumor, and special examination of the mechanism of the ear may yield information which will aid materially in the localization of the lesion.

Pain.—Pain in any part of the body will induce a patient to seek relief more often than any other symptom. Pain in the ear and mastoid, which is not caused by inflammatory diseases, is encountered in daily practice. Because of the complexity of the nerve supply of the mechanism of the ear, there are many possible causal factors; among the more common are the otalgia and mastoidalgia due to unerupted third molar teeth, dental caries, and lesions in the pharynx and nasopharynx, as shown by New. Occasionally, glossopharyngeal neuralgia or neuralgia of the sphenopalatine ganglion is a factor; obviously, the treatment is not local. However, patients with nasopharyngeal tumor have been observed, who have had repeated incisions of the drum, and mastoid operations. Young adults have been seen in whom mastoid operation had been performed or advised because of otalgia, whereas the pain was really caused by an unerupted third molar, or a sphenopalatine ganglion syndrome.

Occasionally a patient complains of pain in the ear coming on early in the morning, which is relieved by arising and moving around. This occurs most commonly in patients past middle life. In large measure it may be overcome by using several pillows to sleep on. Recently I had a patient with this syndrome who is an eminent otologist, and he had suspected some trouble with the posterior sinuses. Pain in the ear, following exposure to wind, may be avoided by placing cotton in the canal.

Vertigo.—A most troublesome group of patients to deal with, from the standpoint of both otologist and internist, are patients with incapacitating vertigo, not infrequently accompanied by nausea and vomiting. This chain of symptoms is recognized as the Menière syndrome, which is the result of toxic neuritis of the eighth nerve. Any source of focal infection, all dietary toxic factors, the excessive use of tobacco, moonshine, and so forth, must be eliminated. There is great difficulty in the satisfactory management of this group of cases. Occasional attacks do not cease until the nerve is totally destroyed.

THE PROBLEM OF THE DEAFENED

The totally deaf person assumes that nothing can be done for him, but the person only partially deafened is constantly grasping for anything or any treatment that he hopes might restore his hearing, and often he is preyed upon. The problem of the deafened is not only the problem of the otologist, but the problem of the physician, friends, and

the clergy. Ordinarily, little may be accomplished with regard to restoration of the hearing in a large majority of the afflicted, but occasionally, in early cases of deafness due to disease of the nerve, rather striking results have been attained.

The mental attitude of the deafened person is paradoxical: he is generally morose and melancholy, and tends to isolate himself, which is in contrast to the blind person, who is happy, bright, and cheerful. I would prefer deafness. Edison says that he enjoys deafness because he can concentrate better. Physicians must show deafened people that the outlook is better than they expect. Hardly anyone objects to the use of corrective lenses for their vision, and the objection to the use of artificial hearing apparatus must be overcome. Employers must be shown that in certain lines the deafened make more suitable employees than individuals whose hearing is normal. In this state a league for the "hard of hearing" is being formed, which deserves the moral support of the public. The science of lip reading is being developed to a remarkable degree, and I believe that in it lies the salvation of the deaf.

SUPPURATIVE DISEASES

All are familiar with the suppurative diseases, but I wish to call to your attention the fact that patients with infected sinus thrombosis have been treated for typhoid fever and bronchopneumonia, and that brain abscess has been overlooked as a complication from infected conditions of the ear.

SUMMARY

Symptoms referable to the mechanism of the ear may be grouped under three main heads: tinnitus aurium, deafness, and pain. Vertigo, with its sequelae, nausea and vomiting, is not generally thought of by the laity as symptoms referable to the ear. Many conditions other than those local to the mechanism of the ear may cause these symptoms. It is within the province of internists to recognize the causal factors. The problem of the deaf does not rest with the otologist alone.

DISCUSSION

Dr. Horace Newhart, Minneapolis: I wish especially to thank Dr. Lillie for his excellent paper, for in it he has eloquently emphasized the point which I have been trying to put over for the past ten years in a feeble attempt to instruct our undergraduates at the University of Minnesota in otology. That point is simply this: The ear must not be looked upon as a disassociated organ taken apart from the rest of the body. This of course has been brought out in connection with the labyrinth, but I think we should also call special attention to the large number of cases of nerve deafness which we encounter, those in which the lesion is not so much in the middle ear but is found in the sound perceiving apparatus, the cochlear apparatus. These cases who come to us without any evidence of inflammatory disturbance in the middle ear but are hard of hearing, should be considered quite as much from the point of view of the internist as of the otologist. Therefore in such cases we should seek the cause in other parts of the body.

Dr. Lillie has called attention to the gastrointestinal tract. To illustrate the point let me say that recently we have had occasion to check up on a patient who had been the rounds of the different otologists for several years, had gone through all the classical operations of tonsillectomy, which perhaps was needed—undoubtedly was in this case—and straightening of the nasal septum. Yet the tinnitus persisted and the impairment increased. She was referred to the internist because we could do nothing to ameliorate her condition, and fell into the hands, through the internist, of the surgeon, who removed the gallbladder. The results in this particular case are so striking as regards the improvement in this patient's hearing, and diminution of the symptoms, that I feel I must call your attention to the possibility of gallbladder disease being a casual factor in nerve deafness, and suggest the gastrointestinal tract as a line of more thorough investigation.

To illustrate still further the suggestiveness coming from ear symptoms: A patient not over two years ago was referred to us by the internist because of the marked symptoms suggesting disturbance of the static labyrinth. The patient was extremely nauseated on arising in the morning, oftentimes could not retain food after she had gotten up, and was in an uncomfortable condition a good part of the year. Examination showed an extremely irritable labyrinth and nothing more. The hearing function was normal. Inspection of the middle ear showed nothing pathological. Yet on attempting to turn this patient in the turning chair, the reaction was so severe that it was almost impossible to carry out the procedure. She was referred back to the internist, who made a careful gastrointestinal examination, finding absolutely no free hydrochloric acid. The patient was cured of her vertigo and nausea in one week by putting her on the right track as regards the digestive tract.

IRRITATIO CONJUNCTIVAE

EDUARD BOECKMANN
St. Paul

With the eyes open, the greater part of the cornea and the bordering lateral sectors of the bulbar conjunctiva are, between the winkings, exposed to the air. The air is never pure but in mid-ocean, in the high mountains, in the arctics and partly in the woods. Our eyes are ingeniously, richly and beautifully supplied with both defensive and offensive armaments for protection against irritations and infections from the air. There is already some protection in the supercilia, but more so in the cilia themselves; there is protection in the sensibility of the skin, but vastly more so in the sensibility of the cornea, which is the most sensitive organ in the human body. On this sensibility depends the frequency of the winkings and the squintings of the lids, and on this sensibility depends the constant secretion of tears with their antiseptic virtues. The conjunctiva and cornea are furthermore protected by a delicate mucous film from the tubular glands in the conjunctiva and perhaps from the epithelium itself and there is a good supply of adenoid tissue particularly in the retrotarsal folds for direct action upon the prospective invader. Besides, the conjunctiva is richly supplied with blood vessels and with lymphatics with the preauricular glands for their rendezvous.

Thus the eye is by nature well prepared to meet the air and defend itself against the hostile elements it contains, and *legio* are the people who pass their span of life with little or no inconvenience, but another *legio* does not fare so well.

The air both inside and outside our dwellings is more or less saturated with ordinarily invisible impurities of all kinds. All of us can see them with the naked eye, when sunlight strikes a darkened room through an opening,—myriads of now visible particles, mineral, vegetal and animal (Pasteur); all of them more or less irritating to the eye; many of them infectious.

Pure air is an everlasting friend; impure air is an eternal enemy with which we are in constant fight and the open eye has all the time its share. No wonder that it will be rather difficult to find a perfectly normal, pale, smooth, thin and transparent conjunctiva, while the cornea, which is not a hiding place for "dust" and which gets the main benefit from the winkings, remains immaculate but for frequent increase of conjunctival mucus, which moves over it in the shape of a thin veil, visible on close inspection with the winkings of the lids or demonstrable by oblique illumination or transillumination. Regularly the conjunctival sac is inhabited by some bacteria,—as a rule harmless saprophytes, which, however, may give rise to some chemical irritation but no infection. The conjunctiva is not a good breeding place for bacteria, fortunately; still, if we neutralize the winkings by bandaging the eye, making a tearless, quiet incubator of it, the bacteria will multiply considerably, for which reason I am an avowed enemy of tight bandaging except in certain cases. It is impossible for the winking eye to remove all the bacteria or other irritating elements that have invaded and even multiplied during sleep, when the eyes bandage themselves; a fight with nature will result and it is this fight that constitutes the objective picture of *irritatio conjunctivae* and which causes the subjective symptoms by irritation and poisoning of the sensitive nerves.

Irritatio conjunctivae—also called catarrh or eyestrain—is without comparison the most frequent of all diseases of the eye. It is an every-day disease and a disease for every doctor. Hardly anybody escapes it in some form or other. It begins early in life, becomes more and more frequent with age to include almost all old people. Still, most people experience little or no trouble and go through life without calling on the profession. It is particularly those who belong to the farm-laborers and who depend more upon their hands than on their eyes for their daily bread and who only read the newspapers or the hymn book, who don't pay much attention to a little conjunctival irritation. Those who spend hours with books in stuffy, illy lighted rooms, or in rooms with electric or kerosene lamps, which irradiate heat, and those not receiving adequate protection from shields or glasses, or failing to have the source of illumination behind the head,—those are the ones so often troubled from conjunctival irritation. It is particularly the nervous, high strung, hypersensitive people, that will suffer from *irritatio conjunctivae* more than the indolent. Consequently girls will often have more trouble from irritation than boys, and women more than men. But there is no reason to take girls and boys out of the school simply because they suffer from *irritatio conjunctivae*. The eyes are made to be used and I think it

is a sane and safe advice to let them use their eyes for all they are worth. A night's rest is all the eyes need and idleness is no cure for *irritatio conjunctivae.*

Irritatio conjunctivae may not stop with the conjunctiva; it may invade the subconjunctiva, the caruncula, the semilunar folds, the cilia, the Meibomian glands, and the canaliculi—and often does. Finally it may extend to the episclera, the preauricular glands and the orbital contents. This invasion of the eye is usually bilateral, but often the one eye is invaded to a greater extent than the other.

Although *irritatio conjunctivae* may be the result both of physical, mechanical, chemical and parasitical elements, usually in combination, the bacterial invasion from the air is undoubtedly the most frequent cause. There may be more or less susceptibility in different individuals, but once rooted in the conjunctiva it becomes a more or less chronic condition. It may be and usually is impossible in a given case to prove the nature of the real offenders. I for my own part have more and more come to the conclusion that tuberculous irritation is not uncommon. It is difficult for tubercle bacilli to breed in the conjunctival sac and real tuberculous conjunctivitis is also a rare disease. I am very slow in accepting an endogenous origin of the same. This is, however, a disputed question. It seems to be easier for the tubercle bacilli to penetrate the conjunctiva and be carried to the subconjunctiva, episclera and the preauricular glands through the lymphatics. When I find indolent enlargement of the preauricular glands, I am always suspicious of the irritation being of tuberculous nature, well knowing that other elements can do the same. A close examination for the presence of preauricular glands with the tip of one's index finger should always be done in *irritatio conjunctivae.* If demonstrated at all, it always means they are enlarged, as the normal glands are so small that they escape our examination. It takes some experience, but will soon be learned by routine practice.

It has often been said that tubercle bacilli have a predilection for the lymphatic glands and the picture of the immense tuberculous glands of the neck is vivid in our imagination. They are not so frequent as they used to be. Fifty-four years ago the Danish physician, Wilhelm Meyer, advanced his adenotomy, which removes the obstructing growth but fortunately not the original adenoid tissue itself. This popular and beneficial operation is undoubtedly the chief cause of the reduction in frequency of tuberculous glands of the neck by striking at the focus of entrance. If tubercle bacilli have predilection for lymphatic glands, it must be the same predilection that criminals have for prisons, for the bacilli are carried thither by the lymphatics for imprisonment and destruction. Oftentimes they put up an awful fight, break jail like other dangerous and cunning criminals, pass to the next glands and even jump them to finally get access to the general circulation and appear in distant organs as metastases. But as far as the eye is concerned I am coming more and more to the conviction that metastatic tuberculous affections are more rare than those of ectogenous origin and that there is no need to deviate from beaten path of entrance through the conjunctiva itself.

Probably we have trachomatous irritations of the conjunctiva that do not develop into real trachoma. I have never found preauricular glands in such diseases. Irritation from Morax-Axenfeld's diplobacillus is common; likewise *irritatio conjunctivae* in "colds" and hayfever. We have *irritatio conjunctivae* from light, heat, electricity, gases and smokes. We have *irritatio conjunctivae* from face powders. We have artificial *irritatio conjunctivae* in patients who like to fool the doctor, and sometimes succeed for a while. And so on. But it always remains with the air and what it contains, to be the principal factor and *irritatio conjunctivae* due to refractive, muscular and accommodative errors are unknown to me.

The objective findings in *irritatio conjunctivae* vary in intensity, extent and character. They are often so trifling that they will escape a fleeting examination and be paid no attention. A moderate hyperemia of the conjunctiva of the tarsal plates—general or localized in the angular parts—is usually the first beginning. The tarsal conjunctiva loses somewhat in smoothness and transparency; still the Meibomian glands are visible. By continued conjunctival irritation the tarsal conjunctiva may hypertrophy and present a sandy or velvety appearance and obscure more or less the Meibomian glands. In protracted cases concrements in the goblet cells are not infrequently found. The retrotarsal folds, which always should be investigated by pressing the globe backwards with the lids everted, one by one, will also often present both hyperemia and swelling, while the bulbar conjunctiva remains unchanged. There is generally some

mucous secretion, and while there may be a little dried secretion in the corner of the eye, there is usually not enough to stick the lids together in the morning. A frequent finding, particularly in children but also in adults, is more or less numerous follicles in the adenoid tissue of the retrotarsal folds. As the lower fornix is a better hiding place than the upper, it is here we find them in the greatest number. Both the caruncula and the semilunar folds may show hyperemia, hypertrophy and even follicles. The edges of the lids may be hyperemic and red as after crying; also seborrheic. The lacrymal puncta may in elder individuals be found small, contracted and even closed, in which case epiphora, which is uncommon in simple *irritatio conjunctivae*, results.

If the subconjunctiva participates in the irritation, the lids may be somewhat puffed and both the bulbar conjunctiva and the subconjunctiva will show a number of vessels running from the inner and outer canthus towards the cornea. The semilunar folds will show a tendency to be drawn forwards. The final result may be pinguecula, pterygium or both. If the Meibomian glands are involved, increased secretion in the form of a white scum in the inner angle is often seen. Pressing the everted lids against each other with glass rods or the fingers will bring out the increased secretion. If the episclera is invaded, we find the deep, bluish, ciliary injection, which can immediately be intensified if we part the lids and expose the eye to the air. The bulbar conjunctiva reddens very little on exposure to the air, while the tarsal conjunctiva does.

If the orbital contents are invaded, we can no longer use our sight. We must use our touch and examine for tenderness. The normal eye is indolent to palpation and pressure. Only the hypersensitive eye may rebel—sometimes even before we touch it. If the orbital sensitive nerves are invaded by the toxins of the conjunctival irritation, tenderness on palpation and more so on pressure will be complained of. The tender eye has received scant attention in the literature. It is to my mind and in my experience such an important finding, that I never consider an examination of the eyes complete without it and the examination itself is simple. Palpate or press the sclera particularly over the insertions of the muscles; after that push the eye against the orbital wall in all the different directions or bore your finger between the eye and the orbital wall and you will soon find where the shoe presses. The finding of tender eyes is of the greatest importance for the treatment.

The subjective symptoms of *irritatio conjunctivae* vary considerably according to the degree, character and complications of the irritation and the disposition and social status of the patient. A good many people do not mind a little irritation at all. The ordinary complaints are that the eyes smart, itch, burn, feel sore and ache. Some complain that the eyes feel sandy and dry; some have a feeling of foreign body and a desire to wink and rub the eyes. Some are sensitive to bright or artificial light, others to radiating heat from the lamp or the stove. Complaints of eye-strain or asthenopia (conjunctival asthenopia) are general, especially among the "high-strung" and "run down." If the eyes are tender, they will all complain of tiring from near work, of tearing, of blurred vision, that the eyes will not "focus right," and also of headaches—toxic asthenopia and toxic headaches—which will be more felt in the evening by artificial light. The eyes will feel tired, heavy and sleepy.

Tenderness of the eyes is often more pronounced on the one side than the other, and if the eyes are tender there will often be morning headaches, which should not be attributed to eye-strain the preceding day. Tender eyes and headaches from overtaxing alone will disappear over night. Endurance both of accommodation and convergence will suffer in tender eyes. To work with tender eyes is pretty much the same as to walk on tender or lame feet.

TREATMENT

Optical treatment.—I have already stated that *irritatio conjunctivae* from refractive, muscular and accommodative errors is unknown to me. This statement is not in conformity with the general opinion in this country, where the slightest error is held responsible for the symptoms of *irritatio conjunctivae* with the result that every complainant gets his glass. Being an air disease, no glass of any description can prevent or cure conjunctival irritation. Overtaxing of the eye and refractive errors will aggravate the condition by the resulting passive hyperemia, which in turn will patronize multiplication of the bacteria present. The patients should consequently be given the benefit of what optical treatment may be of assistance and help in their work.

The human eye in civilized nations sees, in spite of its congenital optical imperfections, everything

that is necessary, and what our eyes do not see our hearts do not feel. Wild people may see two, three up to five times sharper than we. They may need this much for their existence. We do not need it for ours and we do not feel any envy. The wild man's eye is mainly for distance, which means more or less rest; the white man's eye is to a great extent for near work with strain both on the accommodation and convergence and needs the same rest, after a day's work, that the body does.

The most eyes are born hypermetropic (on an average 1.25 diopter) and also astigmatic (0.25 to 0.50 diopter). When the congenital hypermetropia does not exceed 1 diopter, we call the eye emmetropic or normal, and when the astigmatism does not exceed 0.25 to 0.50 diopter, we used to call it physiologic. In this country all astigmatism is called pathologic and held responsible for the symptoms I have attributed to *irritatio conjunctivae.* However, such a slightly hypermetropic and astigmatic eye should not and will not under ordinary circumstances give trouble, before the individual reaches the presbyopic age and should not need correction for their small imperfections. But they will all be fitted with glasses, as soon as eyes give trouble from hypersensitiveness, overtaxing and irritation. And many of those who are fitted with "physiological" glasses derive real benefit and declare they can not do without them, which is difficult to charge up to the low number, but easier to attribute to the glass as such, to the protection against wind and dust, heat and light, to a habit or to auto-suggestion. But all those who come to me with "unsatisfactory" glasses, that they cannot do without and that I myself cannot improve, I advise to continue with them, but not as a treatment for the conjunctival irritation I usually find present in such cases, but for protection pure and simple. A plain glass would probably do the same and such plain lenses I have in my trial case instead of the fractions of 0.25 diopter and in many cases I have found that plain glasses give the same satisfaction as the low numbers. But since it always is possible to find a low number that will fit, I consequently give the patients the benefit of what little improvement in clearness such a weak glass will bring. On the irritation itself these weak glasses have no influence.

The belief in the almighty glass has become so ingrown in the people that they go to the specialist, the optometrist, the optician or the traveling refractionist to get glasses when troubled with their eyes and head; only a small minority hope that it will not be necessary to be fitted. Each eye is tested and corrected separately and the patients are told to wear the glasses all the time. If the glasses don't prove satisfactory, the doctor says that the eyes have changed; but the next correction is no better. Another doctor is consulted; he must go his predecessor one better, but fails. And so it often happens that a patient presents himself with his pocket full of glasses,—all of them very much alike and of the lowest numbers and usually different for each eye. This is an almost daily experience. Not seldom has the patient been overcorrected after skiascopic examination on the dilated pupil with accommodation paralyzed and has gotten presbyopic glasses with reduced distant vision; and all of them are dissatisfied with the new condition of affairs.

The success of refraction work as such does not depend upon compelling the patients to wear constantly the glasses the doctor has in his wisdom prescribed. The patient is the last and real judge, and when he is not satisfied, while the glasses in themselves may be correct, I draw the simple conclusion that it is not a glass he needed but a medical treatment for what in the most cases will appear to be conjunctival irritation, which has not received any consideration or been overlooked. Irritation or no irritation, I am always of the opinion that people working under electric light should have "physiological" glasses for protection and that people exposed to wind and dust, or occupied with milking, harvest work or threshing should have glasses for temporary protection.

Since our eyes are not optically perfect, the professionals believe they should be rendered as perfect as possible with glasses and there is nothing to say to that—let people have what they want. But when glasses are indiscriminately prescribed for the treatment and cure of all possible eye troubles, it becomes a public nuisance. Every individual will become an eye-patient, if he lives long enough; but to consider every individual a born eye-patient, that shall have a glass as soon as a professional gets hold of him, shows certainly a sense of business but lack of understanding, experience or judgment. No wonder that so many people after awhile throw off their glasses, when they understand that they neither help nor beautify. Fortunately superfluous or even wrong glasses never

cause any injury to the eyes, only discomfort, besides being a costly experiment in the present times. It is not uncommon among the people to blame the glasses for having spoiled their eyes. This is unjust and I always tell them so frankly. Glasses are not made for health or decoration, but for comfort and protection.

The eminent Danish oculist, Edmund Hansen-Grut, a pupil of Graefe, wrote some fifty years ago, when fitting glasses in all possible eye troubles began to be an epidemic, that if the doctor would pay more attention to the patient's conjunctiva, he would generally find some catarrhal trouble and that treatment for this would make glasses superfluous and save a fortune. I felt guilty at the time, sat down and took notice and have remembered it ever since with increasing conviction of the truth of it. Still I often prescribe protection glasses as already stated. I never prescribe glasses that dim the distant vision and enlarge the print. And when I find that the patients have been overcorrected and got presbyopic glasses, I always change them, if the glasses have not already made them presbyopic, when they may need them for near work.

When I myself so often have disappointed my patients in my refraction work, which I have been at for fifty years, I do not hold my methods—the ophthalmometer, the ophthalmoscope and the subjective examination—responsible, although this examination in the American eye is unsatisfactory, as it does not include skiascopy on the dilated pupil with accommodation paralyzed. When I slip, it is either because my judgment has not been good or because I have overlooked or underrated the conjunctival irritation and missed the tender eye or that I have run up against hysterical and neurasthenic women whom nobody can please (copiopia hysterica, Forster). Donna é mobile. (Rigoletto.)

Local treatment.—A local disease requires a local treatment and generally people with *irritatio conjunctivae* not only get glasses but at the same time a prescription for simple lotion or eyedrops or salves. Salves do not do as well in conjunctival irritation as solutions. Their place is on the lids and their margins. To clean out and disinfect the conjunctival sac must be our aim. For cleaning out there is no better remedy than salt, boric acid or biborate of sodium solutions, all of which are non-irritating placebos that work mechanically and should be used in an eye-cup (mechanical housecleaning). For disinfection of the conjunctiva we have zinc, quinine, the different silver preparations, copper, alum and mercurial preparations, as calomel, sublimate and, last but not least, mercurochrome. The disinfectant for the conjunctival irritation should preferably be as little irritating as possible. Therefore, nitrate of silver in 1 to 2 per cent solution has no place here. The other silver preparations I have long ago discarded, as I believe we have better chemicals at our disposal. The oldest, tried and most popular disinfectant or astringent, as it is called, is sulphate or chloride of zinc, which is claimed to have a specific action on the frequent Morax-Axenfeld's diplobacillus irritation and helpful in others. It is difficult to understand how a couple of drops instilled once or twice a day in the conjunctiva, which cannot hold even one drop and from which the drops are immediately expelled, can be of real antiseptic value. When experience nevertheless has proven the beneficial influence of such drops, many believe there must be some sort of biological action—chemo-biological action. If to zinc solutions is added adrenalin and cocain we have a really wonderful eyewater with increased action of zinc and with immediate relief from the astringent adrenalin and the anesthetic cocain. We are warned against the routine treatment with cocain. I myself do not know that I have ever seen anything that should prevent one from adding 0.5 to 1 per cent cocain to the solution. Adrenalin can be added freely, up to 50 per cent. I always add a little bisulphate of quinine to the zinc solution to increase its antiseptic properties. This gives the solution a beautiful fluorescent, bluish color. Such an eyewater or eyewash is very popular among my patients with *irritatio conjunctivae.* The only trouble is that they cannot refill the bottle without a new prescription. I have been so satisfied with this solution that I have not tried Butyn, which is non-narcotic and which does not require new prescriptions. For the same reason I have no experience with resorcin, while I sometimes touch the patient gently with alum and copper pencils.

A great man—Fuchs—writes great words about "collyrium adstringens luteum" (Horst's Eyewater) —"that it gives excellent success and is in many instances not to be replaced by any other." It is a mixture of chloride of ammonium (0.4); sulphate of zinc (1.0); dissolve in 180 grams distilled water; add camphora (0.4) dissolved in dilute alcohol (20); add crocus (0.1), macerate through

24 hours, shake often and filter. Dilute it for use with 50 per cent distilled water. Having tried this for *catarrhus senilis*, I prefer a 1 per cent solution of mercurochrome, the new Baltimore germicide, which I have already mentioned in a paper on "herpes corneae" last year and which I will take the opportunity to give a special mention.

The originators of mercurochrome—prominent Baltimore urologists and chemists—have designated it "a general germicide, deeply penetrating, non-irritating, of low toxicity and of relatively quick action." It was originally intended for urological purposes, but was soon adopted and praised by the eye, ear, nose and throat men. I began using it for sterilizing the eye before and after curetting the cornea in *herpes corneae*. But I did not use it for daily treatments for fear it might be a cell poison and retard epithelization. Being a powerful antiseptic it is consequently not an epithelial food, but being of low toxicity the possible retardation of the epithelization is counterbalanced by the fact that it assists materially in keeping the eye aseptic, thus favoring the epithelization rather than retarding it. I have learned to know that mercurochrome is the simplest, safest, quickest, deepest and least irritating antiseptic we have for ophthalmological purposes—but not the most powerful; neither is it omnipotent. Thus in serpentic ulcers of the cornea, where we have no time for experimenting, I don't trust it alone even with frequent instillations up to 5 per cent solutions. But I do believe that any corneal ulcer during harvest time or threshing season should be immediately and repeatedly treated with 2 per cent solution of mercurochrome and I feel confident that this dreadful disease which causes the loss of so many eyes could be checked. Since we do not have a surplus of useful antiseptics, mercurochrome has been most welcome to me. We need a variation, since the eye will get used to one and the same remedy, which will lose in action. I experimented both with acriflavin, and proflavin, before I got hold of mercurochrome. They were good, non-irritating antiseptics, but hold no comparison with mercurochrome in my experience.

Mercurochrome is a mercurial compound with an intense, beautiful red stain. As this stain, which sticks long and has been difficult to remove, has been objectionable both to urologists and oculists, the same Baltimore men have lately presented us with another mercurial compound with "invisible" stain,—meroxyl. But in ophthalmology it cannot replace mercurochrome, for it is said by the originators to be certainly a more powerful antiseptic but at the same time more irritating and toxic and less penetrating. I hardly believe it has any future in ophthalmology in spite of being non-staining. I personally have no particular objection to the mercurochrome stain; neither have my patients. It is true that red eyes and a red nose never have been considered decorative; but it is also true that the red stain from mercurochrome on the lids and face can quickly be removed by cold-cream or noviform ointment, and the conjunctival and corneal stain soon is removed by the tears or by any eyewater which contains cocain or, still better, holocain, which immediately will precipitate the stain, which henceforth will be removed by the tears. To control the staining of the face, I always make the instillations with the patients on their backs, protecting the face on either side with gauze.

Far from objectionable, I consider the stain itself a wonderful thing for immediate diagnosis of even the minute epithelial defects which it will color intensely for some time and which often are overlooked if not stained. We have heretofore used fluorescin for demonstrating epithelial defects in the cornea; but mercurochrome is much simpler and better, both for conjunctiva and cornea, and has in my practice replaced fluorescin entirely. If no epithelial defects, the natural or increased mucous film on the conjunctiva and cornea will only be passingly stained.

Mercurochrome is claimed to be non-iritating. It would be wonderful if true. It seems inconceivable that such a powerful germicide should be so. Still it is a fact that mercurochrome in 1 or 2 per cent solution, put into a normal eye, scarcely reacts on the victim. Thus, in disinfecting a normal appearing conjunctiva, preparatory to cataract operation, the patient experiences hardly any irritation. But if the conjunctiva is irritated, which is usually more or less the case in old people, and if the patient at the same time is hypersensitive, which old people sometimes are, smarting sensation will follow instillation, lasting usually a short time, being moderate in degree. I have seen cases of *irritatio conjunctivae*, where the eye after instillation with mercurochrome has burned like fire and caused so much misery that relief by cocain or holocain was appreciated. Such cases are, however, exceptions to the rule. Mercurochrome is not more irritating and for no longer time than anybody can stand

without kicking and consequently I have up to this time not disposed of it in any case and neither has anybody asked to be excused. I have never seen idiosyncrasy for mercurochrome or permanent staining. I further think that mercurochrome is a pretty reliable test not only for the degree of irritation, but also for the existence of irritation which the patient might not be conscious of himself. If mercurochrome produces only a moderate, temporary discomfort, no cocain or holocain should be instilled, in order to give the antiseptic full sway, and it can be properly instilled one or more times a day in any conjunctival, corneal or lacrymal trouble. In simple conjunctival irritation, once a day is sufficient.

Usually I give the patients prescriptions both for 1 per cent mercurochrome and for the named compound zinc solution from a stock solution, the formula of which is printed on the back of my prescriptions (boiling water 1000; glycerite of boroglycerine 50; quinine bisulphate 1; zinc sulphate 5; hydrocyanic acid, dilute, 15); cool and filter. For eyewash I add 10 per cent adrenalin and 0.5 per cent cocain; for drops I add 30-50 per cent adrenalin and from 0.5 (children) to 1 per cent (grown) cocain. If a couple of the "red" drops irritate, I advise to put in a couple of "white" drops afterwards; always in a recumbent position, in the corner of the eye with subsequent winkings or pulling down of the lower lid. Oftentimes I alternate —"red" drops one day and "white" drops the next. In old people I also prescribe Horst's eyewater for a change. Both the "white" and the "red" drops will deteriorate in time, for which reason I do not prescribe more than 30 grams at the time. Fuchs advises against putting in drops at bedtime, but he does not give any reason.

If there is only *irritatio conjunctivae*, the patients get along very nicely with the "white" lotion or drops and with the "red" drops. I never prescribe mercurochrome for eyewash, which requires sitting position and a towel. As the *irritatio conjunctivae* is a more or less chronic condition, often obstinate, I advise my patients to stick it out and not to drop the treatment too soon and to always have the remedies on hand.

In complications with subconjunctival irritation, which usually comes later and which is more chronic, troublesome and obstinate, the treatment is the same as for simple conjunctival irritation. In such cases I also try my way with salve—2 per cent yellow oxide of mercury or 5 per cent noviform ointment. With a glass-rod I put some salve into the conjunctival sac, followed by a good rubbing or massage of the eye. Often the salves are not tolerated and must be dispensed with.

Red, squamous margins (seborrhea), which should always be looked for, should be treated with salves as the chief remedy. The salves should be as little irritating as possible. At this time I know of no better ingredient than noviform, made into an ointment with equal parts of distilled water, white vaseline and anhydrous lanolin, which is a cleaner product than the ordinary lanolin. The salve should contain from 3-10 per cent noviform. The best time for applying this salve is at bedtime. After good rubbing, the excess salve should be removed with the eyelids pinched together so that an anointed margin will be left for the night. If applied in the morning, all traces of salve should consequently be wiped off. I further advise to pluck out all loose hairs in the morning. Sometimes the vaseline itself is irritating. In such cases cold-cream may do better.

If the Meibomian glands are involved, the increased secretion can be removed either by lid massage or by pressing the upper and lower tarsus against each other on everted lids.

If the canaliculi, the tear sacs and the lacrymal canals participate in the trouble, if there is any epiphora, which very seldom results from simple conjunctival irritation except in hypersensitive individuals, the patency of the lacrymal ducts should be tried with instillation of 2 per cent mercurochrome in the recumbent position under vigorous winkings. If the system is patent, the handkerchief will soon show red stain. This test only shows that the system is patent, but not to what degree; it must be easy permeable to tears if epiphora does not result. Even the normal eye will tear in sharp air and wind. A simple hyperemia of the canaliculi is enough to hinder the tears from passing easily. Therefore, if the local treatment of the conjunctival irritation does not stop the epiphora, I slit the canaliculi to the opening into the sac, making a complete gutter of them. While there is hardly any bleeding from splitting a normal canaliculus, a hyperemic canaliculus will bleed freely. Often I find more or less stenosis in the canaliculi and even complete obliteration of the puncta. The epiphora will stop, provided there is no obstruction of the lacrymal canals, which, however, often is

the case. For this test I use an ordinary eye-dropper with a pointed, smooth tip, which I make myself and which at the same time allows a free stream. If the lacrymal canals are open, but little pressure on the bulb forces the water easily through. If that is not the case, I probe and dilate the canals with Theobald's probe No. 7 and 8,—only once as a rule; after that I let a syringeful of 1 per cent mercurochrome run through, with repetition every day. Next day the solution may not get through, but it often will during the next days without further dilatation, which, however, may have to be repeated. If there is real dacrocystitis present, I continue the instillation and injection with 1 to 2 per cent mercurochrome and since I have begun with this treatment, two years ago, I have never been compelled to operate on the sac one way or the other.

I am sighing now that I take up the treatment of the tender eye and headache. Up to now, I have held the conjunctival irritation responsible. I have not crossed the stream for water, but I may not have seen the woods for trees. When the accessory sinuses—the troublesome neighbors of the orbitae with their precious contents—gained such reputation that everybody with a cold and headache spoke of sinus trouble and the rhinologist let the oculist know that it would be to his advantage to consult the rhinologist before putting glasses on for aching eyes and headaches, I was so impressed by the idea that I referred everybody with tender eyes or headaches to my rhinological brother. Through bloodvessels, lymphatics and nerves the orbits communicate with the nose. The usual report was, that there was either nasal irritation, deviated septum, atrophic or hypertrophic catarrh, crowding on one side or the other, polypi or clear sinuses. The headaches were explained as vacuum headaches.

The nose, which inhales contaminated air day and night and exhales it again free from all contamination (Tyndall), tries to rid itself of the impurities which have settled down upon the mucous membrane, through blowing with a handkerchief or the finger. The rich man puts the product in his pocket, while the poor man gives it back to the earth from which it came. The result for the nose is the same, but there is lots left and colds in the nose and head are therefore a very common thing. That toxines from the mucous membrane of the accessory sinuses may invade the orbit through their thin bony walls and often do is beyond all question. Real infections from the accessory sinuses have also at times invaded the orbit. How much of the tenderness and headaches in a given case should be attributed to the sinuses and to the existing conjunctival irritation is consequently impossible to say. It is possible that nasal irritation may pass through the lacrymal ducts into the conjunctiva and produce conjunctival irritation. This is, however, against the stream and is certainly rare. This is a disputed question at any rate. But whether the conjunctival irritation comes from the nose or originates in the conjunctiva, the fact remains that tenderness of the eye and headaches due to the orbital tenderness remain in spite of rhinal treatment, which should always be tried and which so often is beneficial to the patient's nose and attributes. Therefore, I shall continue to refer my patients with tender eyes and headaches to the rhinologist.

Tender eyes and headaches may also result from general conditions,—from rheumatism that troubles so many people in middle and advanced years. They may also result from supraorbital neuritis, not only ascending from the conjunctiva or the accessory sinuses, but also descending from intracranial or other causes. The region of the supraorbital nerves is often the most tender spot. Tenderness and headaches from simple hypersensibility alone is certainly not uncommon; it runs in the family. But, on the whole, I do believe that tender eyes and headaches most frequently are the direct result of conjunctival irritation. Not all patients with tender eyes complain of headaches, but all of them complain of asthenopia or eyestrain.

I have often found some relief from occasional use of headache tablets. I have found them to be better than aspirin, which is so advertised, so often resorted to and also prescribed for all kinds of headache. The special local treatment I most rely upon is rubbings and massage of the tender eyes. Some people are afraid of rubbing their eyes. I don't think the doctor told them so. Rubbing of the eye, which so many with conjunctival irritation and tender eyes feel like doing and also do, may be an instrument to press bacteria and other irritating elements into the subconjunctiva; but as there are always two sides to every question, rubbing may also be an instrument to drive the obnoxious elements out of the conjunctiva, for which reason I unhesitatingly and without regret have recommended not only general rubbing of the eye through

the lids in the usual way (we all do it), but also special massage of the tender spots with the finger-tip wherever they are found, keeping it up gently until the tenderness is gone, which always results. If the patient would make a routine of such massage, he would soon learn to do it both properly and effectively. It is particularly recommended when the eyes have tired from near-work, when the eyes blur, the tears begin to come and the eyes and head ache from accommodation spasm and convergence. That is the time to take a little rest, lay off the glasses, if any, and spend a few minutes on the eye. The most tender spots will usually be found in the region of the ethmoidal and frontal sinuses, the supraorbital nerve and the inner recti muscles; also back of the eye, when pressing the eye backwards in the direction of the sphenoidal cells. Such massage hurts often more in the one eye than in the other, which might be perfectly free. Therefore be not too rough; all massage should be done with gentle fingers. Then go to work again. The oftener the eyes are massaged, the better.

Massage is a good adjuvant in the treatment of tender eyes from nasal, conjunctival or combined irritation and will always give relief if carried out for a long time, which I believe comparatively few people have patience to do; while hunting for curative glasses in otherwise normal eyes is like hunting for a needle in a haystack, I don't criticize the honest and conscientious doctor who wants to give the patients the benefit of the doubt. The people want glasses and let them have what they want; but let them particularly have the benefit of local treatment.

There is a natural cure for every disease. Unfortunately, people die while the cure is going on. There is also a natural cure for tender eyes and headaches and old people are really little troubled with any of them. Headaches is not an old man's or woman's trouble.

General treatment.—I always inquire about the general condition of my patients with conjunctival irritation. Children with conjunctival irritation, numerous follicles which by themselves many times do not cause any trouble, and with preauricular glands, and glands on the neck, I always refer to the nose and throat man with a plea to respect the tonsils, which are there for an important purpose and which should not be sacrificed unless they continually are so diseased that they are not amenable to local treatments and the conclusion is drawn that they do more harm than good. Troublesome adenoids I like to see removed. I prescribe the old Iodide of Iron for internal medication in the anemic and scrofular; I further advise a vacation spent in the country away from the roads, preferably where there are woods, plenty of butter and fresh milk.

With conjunctival irritation in grown people, I always like to examine the urine and also to take the blood-pressure. What I examine for in the urine is not particularly albumin or sugar, but the specific gravity, color and toxicity (chromaturia indicanuria). A pale urine of low specific gravity means ordinarily nervousness in females and beer in males. Nowadays a man's urine is seldom pale, deplorably. The pale urine in girls tells me why they suffer more from the inconvenience of conjunctival irritation than men with normal specific gravity. They are invariably neurotic and hypersensitive. The toxicity of the urine from alimentary sources is very simple and easy to demonstrate by pouring some 70 per cent nitric acid into a small conical glass, half filled with the patient's urine. Between the heavier acid on the bottom and the lighter urine on the top there immediately appears, with great regularity, a zone of different colors with greatest intensity after a minute or two. A pale urine will give very little color zone; a normal urine—for instance, your own—will give more, and when the examiner has satisfied his mind what is normal and subnormal, it will be easy for him to judge the degree of increase. If albumin is present, it will appear directly above the colored zone. If the urates are increased, another white sharp ring will appear above the albumin (high and low ring). Increased toxicity of the urine (sapremia) requires a cleaning out to find out if it is only of passing nature. If it persists, a diagnosis should be made; but this does not belong here. Increased toxicity in old people means usually "weedy" colons and they cannot be weeded out with diet, medicine or with Metchnikoff's Bulgarian milk treatment. I let them eat or drink what they like and what agrees with them. Such chronic intestinal sapremia may be one of the causes of early senility with high or low blood-pressure; it may also be one of the causes of "rheumatism" of the eyes as well as the body; but we do not need to look upon it as a cause for "catarrhus senilis." I think these old people do much better with a general

nerve tonic, than with anti-rheumatic medicines and iodides. Thus my experience runs at least. So I give these old people what benefit there is in continued use of a favorite prescription I have adhered to for many years: Tincturia Nucis Vomica 50; Phosphoric Acid (dilute) 100; Tinctura Gentianae Compositæ ad 500. Sig: A teaspoonful in a wineglass of water before meals. This I give them whether the blood-pressure is high or low. It is a good prescription for old people,—a "pep" or "rejuvenation" preparation.

In pale, worn-out girls with pale urine, I like to take the hemoglobin test. If the coloring is below 70, I give them the same medicine, which they usually soon get used to in spite of its bitter taste. It works better than the same combination in "sugar-coated" pills. The mixture stimulates their appetite and gives them all the iron from the food they need. I have for many years turned my back on iron preparations without denying their usefulness in cases of anemia.

In sending out this humble message to the medical profession at large, I fully realize that I have not solved any medical question to universal approbation. It is only my personal views after fifty years' experience that I have expressed. Medical science is as infinite as the universe. The last word has never been and never will be said or written.

MANIFESTATIONS OF FOCAL INFECTIONS IN THE RESPIRATORY, CIRCULATORY, URINARY, AND GASTRO-INTESTINAL SYSTEMS IN INFANCY AND CHILDHOOD*

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The idea of focal infection is not new. Everlin in 1789 appreciated the relationship of tonsillitis and rheumatism. Benjamin Rush[1] in 1818 reported a case of rheumatism of the hip cured by extraction of a carious tooth. The principle of focal infection as a cause of acute and chronic systemic disease has now been fully accepted. It is made the basis for a large proportion (estimated as high as 70 per cent) of present medical practice. Credit for placing this work on the firm scientific foundation of today goes to Billings and Rosenow.

Billings[2] defines a focus of infection as "a circumscribed area of tissue infected with pathogenic organisms." Foci may be located anywhere in the body—most often in the mouth, its communicating cavities, and regional lymph structures. At times a focus may be located in a most unexpected quarter. A great many pathogenic organisms have been found as offenders, those heading the list in frequency and importance being members of the streptococcic and pneumococcic groups. Systemic disease results when pathogenic organisms, their soluble toxins, or their debris set up pathologic changes in tissues or organs which may be contiguous to, or far removed from, the original site. Transportation occurs by hematogenous or lymphogenous routes. The list of diseases caused by focal infections is already too long for recital. Undoubtedly others will be added in the future.

With this very brief statement of the principles of focal infection we may proceed to our topic—Manifestations of Focal Infections in the Respiratory, Circulatory, Gastro-Intestinal and Other Systems. On these subjects volumes have been written, mostly, however, on studies concerning the adult; little has been done on infants and children. I can only briefly touch on a few of the disorders of infancy and childhood.

MANIFESTATIONS IN THE RESPIRATORY SYSTEM

During three-fourths of the year, in this latitude, respiratory infections provide the bulk of our everyday work. To the casual observer many of them are more or less trivial. However, bronchitis, broncho-pneumonia, lobar pneumonia, pleurisy, and empyema contribute heavily to infant and child mortality. These conditions, so often fatal, are rarely, if ever, primary—they are practically always secondary to infections higher up. Our wave of serious lung diseases occurs late in the winter and in the spring. It is preceded by waves of milder upper respiratory infections such as rhinitis, pharyngitis, tonsillitis, otitis, etc. What rôle does focal infection play in this? We believe a large one.

Repeated infections of lymphoid tissue and sinuses in and adjacent to the respiratory passages lead to: (1) loss of weight, anemia, and general

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debility in our little patients; (2) lowered resistance to bacterial invasion; (3) increased virulence of infecting organisms.

The stage is now all set for a serious illness which may follow a new infection, or if infection is already present may follow indiscretions in exercise, diet, clothing, etc.

I wish especially to emphasize the latter factor. We have just gone through a cycle when drafts and chilling as determining factors in infection have been scoffed at. But with our present mode of living we know that chilling of body surfaces profoundly affects the circulation in mucous membranes, predisposing to infection. Rosenow has also shown that chilling may increase the pathogenicity of bacteria in the tissues.

We feel, therefore, that removal of proved foci of infection along the upper respiratory tract will prove extremely valuable as a prophylactic. Our efforts should not be limited to surgical interference. Diet, cod liver oil, rest, and heliotherapy are valuable adjuncts.

ASTHMA AND FOCAL INFECTION

It may be true that asthma is most often an anaphylactic reaction to foods, pollens, dust and bacterial proteins. Walker[3] has shown, however, that in the absence of positive protein tests the removal of foci of infection about the teeth and in tonsils may prove curative. Oftedal[4] has shown that rabbits injected with streptococci from asthmatic sputum present foci of infection in the bronchial musculature.

A critical survey of an asthmatic must therefore include a search for focal infection as well as the performance of sensitization tests.

THE CIRCULATORY SYSTEM

When free from congenital defects the heart in infancy and childhood is peculiarly competent for its work. Changes resulting from sclerosis of vessels and chronic kidney pathology with resultant hypertension are rarely if ever met with in early life. Heart disease in children is preeminently a manifestation of focal infection. The relationship of tonsillitis, rheumatic fever, chorea, and heart disease is recognized by all. The experimental work of Rosenow[5] adds scientific proof of the correctness of clinical observations. It would be superfluous at this time to carry the discussion to further detail.

I should like, however, to make a few observations as applied particularly to children's work.

1. Caries and abscesses about the deciduous teeth may be the cause of heart disease; therefore the same care should be given the first set of teeth as is awarded the permanent set.

2. The early removal of foci of infection in children often gives most gratifying results in heart disease. More may be expected than in the adult where long continued infection has produced chronic degenerative changes.

3. If not in acute decompensation the heart stands the anesthetic and surgical attack, incident to the clearing up of foci, unusually well. Murmurs may be disregarded in considering operative risks.

4. Paroxysmal arrythmias (tachycardia) do rarely occur as the result of focal infection in the child. The exhibition of quinidin and allied drugs should not precede search for foci of infection.

5. Though difficult of statistical proof as yet, I feel our knowledge of focal infection and its appropriate application has greatly reduced the incidence of heart disease in childhood.

MANIFESTATIONS IN THE GENITO-URINARY SYSTEM

A. Nephritis.

In children the typical form of nephritis from focal infection is the acute glomerulonephritis: the mode of infection is hematogenous; the symptoms —lessened quantity of bloody urine, albumin, casts, and a soft edema. The attempts to demonstrate bacteria, presumably streptococci, have not met with much success. Grulee[6] reports bacterial studies in six cases, and more recently Hill[7] in twenty-one cases. Hill suggests an explanation for the failure to find the organism in the fact that cultures of the urine were not made at the onset of the disease. He also raises the question whether the kidney might not suffer from a soluble virus or toxin.

We do, however, recognize the clear-cut clinical picture of a chill, fever, leucocytosis, and other symptoms of an acute infection to be followed in a few days with bloody urine and the findings of an acute nephritis. In the sequence of events it is also the usual thing to find a focus of infection in an acute tonsillitis, otitis media, mastoid abscess, or cervical adenitis. We have all also seen a rapid subsidence of the nephritis after drainage of ab-

scesses at these sites, or removal of diseased tonsils. So, though bacteriological proof may be lacking in most cases, from clinical observations we must look for foci of infection in every case of acute nephritis in children.

B. Pyelocystitis and Pyelonephritis.

This is one of the most frequent diseases of infancy and perhaps one might say one of the least understood. It is a disease presenting the signs and symptoms of an acute infection—the presence of pus and the colon bacilli in the urine. It has therefore been assumed that the disease is due to an invasion of the kidney pelvis and kidney tissue with colon bacilli which gain entrance by one of three routes:

1. An ascending infection through urethra and bladder.
2. By lymphatic channels from the bowels—a normal habitat of the colon bacilli.
3. Through the blood stream.

Proof is accumulating that the disease is the result of focal infection. May I cite an illustrative case? A little female child entered the University Hospital with a severe pyelitis which cleared up after some weeks. An acute tonsillitis precipitated a sharp return of the pyuria, which again cleared up after some weeks. Thinking it good evidence of focal infection we advised removal of her tonsils. Removal of the tonsils and adenoids was immediately followed by a return of her symptoms, which again cleared up after a few days' treatment.

The idea of this disease being the result of focal infection appears illogical since the organism practically always found is the colon bacillus, and this organism is not found in oral sepsis nor infections of tonsils, ears, cervical glands, etc. However, the work of Bumpus[8] furnishes almost indisputable proof that in pyelonephritis the streptococcus is the primary invading organism, which is quickly replaced by the secondary colon infection. This fits in with Hill's observations and again explains why a colon bacilluria may persist after symptomatic recovery from a pyelitis.

It would therefore seem wise to search for foci of infection in all cases of pyelocystitis.

MANIFESTATIONS ALONG THE GASTRO-INTESTINAL TRACT

In the adult the principle of focal infection has been accepted at least in part, *e. g.*, gall bladder infections. In children little has been done experimentally, though clinically we recognize certain manifestations. Time, however, permits little more than their simple tabulation.

1. Cyclic Vomiting.

This disorder is often typically the result of focal infection. In the majority of cases the onset of an attack stands in close relationship to an upper respiratory infection. Conversely the removal of these foci, for instance, diseased tonsils, results in a high percentage of cures. Taylor's[9] figures confirm this assumption. In some cases the focus of infection is found in the appendix, gall bladder, or kidney.

2. Gastric and Duodenal Ulcer.

Though this field is obscured by the smoke of the perpetual battle between the surgeon and the internist, it seems safe to conclude that ulcer may be the result of a focal infection. I bring this topic up for discussion, not as further proof, but call your attention to its unsuspected frequency in children. Holt[10] reports ninety-five cases in infancy; Gerdine and Helmholz[11] report eleven cases and comment on its infectiousness and epidemic form. Palmer,[12] more recently, comments on its symptomatology. The condition is hard to diagnose, perhaps largely because we have not been on the lookout for the disorder. Careful observations and diagnostic methods will doubtless make it demonstrable when suspected and present.

3. Appendicitis.

We are all familiar with the picture of an acute appendicitis closely following an acute angina. Rosenow,[13] experimentally, has produced lesions in the appendix in animals by the injection of organisms into the blood stream. Kritz[14] believes that acute appendicitis is always hematogenous and never primarily caused by infection within the lumen of the appendix.

4. Mucous Colitis.

Preston's[15] reports suggest that this disorder may be the result of a focal infection and not of necessity due to primary local disease.

5. Acute and Chronic Diarrhea in Infancy.

A most striking and frequently overlooked manifestation of focal infection is a certain type of diarrhea. Czerny labels it diarrhea due to parenteral infection. If a feeding case does not clear up on a reasonable routine, it might be wise to look for a source of infection outside the intestinal tract.

We have seen a most speedy cure, without change in the feeding schedule, follow drainage in chronic otitis media.

These remarks perforce are sketchy since the field is so enormously broad, but it is hoped that by mentioning the disorders and their presumed, if not proven, relationship to focal infection, that by careful histories, painstaking observations and complete reports we may eventually enlarge our knowledge so as to clear up the etiology of some puzzling systemic disorders of childhood.

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GASTRO-INTESTINAL MOTILITY*

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It is well from time to time for physicians to review the published results of work done by those in special fields; this is particularly true concerning the work of physiologists. As new and interesting facts are brought out they are too often published only in journals devoted to special work and are, therefore, not available to the average physician. As a consequence, physicians are accredited with a lack of interest in the results of experimental work and in their application to medicine. It is true that the study of normal function is didactic and to some is likely to be uninteresting. However, a review of the available literature on gastric and intestinal motility was undertaken and it is hoped that a short summary may be of interest to members of the Society.

It is not feasible to consider one part of the gastro-intestinal tract independently of other parts; yet time does not permit a full consideration of the subject and attention will be, therefore, directed more especially to the stomach with special reference to motility and to the control of the pyloric sphincter.

It is obviously unnecessary to discuss in detail the anatomy of the stomach; one or two interesting features only will be mentioned. The first of these concerns the arrangement of the musculature of the stomach walls. The wall is composed of three layers of muscular tissue, covered by peritoneum and lined with submucosa and mucosa. The outer layer of muscle is longitudinal, the middle is circular, and the inner is oblique. The middle coat is said by some authorities to be thickened in the plane of the incisura angularis, where greater demands are made upon the muscle structure. The circular layer terminates on the right by a piling up of the circular fibers to form the pyloric sphincter. The fibers of the inner layer are placed as U-shaped bundles which loop over the stomach immediately to the left of the cardia. The uppermost fibers of this layer run vertically downward over the whole length of the body of the stomach, both on the anterior and posterior surface. Jefferson describes the layer as having its right margin sharply defined,

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a narrow band extending from the incisura cardiaca to the pars pylorica. The contraction of this muscle, according to Kauffman, forms a canal underlying the lesser curvature and seen only when liquids and soft foods are taken. Lewis described the canal as seen in the fetal stomach and called it the canalis gastricus. As seen by Lewis "it follows the lesser curvature, appearing as a groove when viewed from the inside of the stomach. It suggests a continuation of the esophagus split open toward the gastric cavity, an open canal which may become a tube during its physiological activity by the approximation of its lips." In the adult, all anatomical trace of the canal has disappeared and yet the area functions, in many cases, as a canal and, as stated by Hartung, the first few mouthfuls seem to follow in grooved arrangement along the lesser curvature called the "magenstrasse" by the Germans.

The nerve supply to the stomach is from the pneumo-gastrics, the splanchnics and the sympathetics from the solar plexus. The plexus of Auerbach lies between the longitudinal and circular coats of muscle. The plexus is known also as the myenteric plexus and the local reflex, initiated by it, Cannon has named the myenteric reflex. All movements of the stomach continue after its separation from the body. This was shown as long ago as 1886 by Hofmeister and Schutz. Cannon showed that, after division of both vagus nerves and the splanchnics, there was a temporary lessening of muscular movement after which normal peristalsis was restored. These movements he believed to be initiated and maintained by the plexus of the Auerbach. He states that the function of this plexus is to insure an orderly progression of the contents of the gastro-intestinal tract.

The Myenteric Reflex.—While watching a rubber balloon in the small intestine Cannon discovered that if the wall of the intestine was pinched with a pair of forceps, a constriction at that point occurred, and at the same time there was relaxation below. In that way, propulsion of intestinal contents was effected down the tract. These movements he believed were initiated by the plexus of Auerbach and the reflex he called the myentric reflex. Bayless and Starling were able to demonstrate the same movements under stimulation but preferred to designate the reflex by another term: "the law of the intestine." Cannon was not always able to demonstrate the reflex, the reason for which could not be explained. Recently Alvarez in over two thousand stimuli applied to the intestines of rabbits was able to elicit the reflex only twenty times. In all other instances there was contraction both above and below the point stimulated. Alvarez believes that these results were obtained because the experiments were carried out upon the normally digesting bowel instead of one distended by a rubber balloon. The experiments are mentioned only to show the uncertainty concerning the nerve control of the gastro-intestinal tract, which, in accordance with the "gradient" theory of Alvarez, is limited to the regulation of tonicity in the muscles and co-ordination of the whole tract. The principal fact to be noted in this connection is that gastro-intestinal muscles will contract rythmically after all extrinsic nerves have been severed and after Auerbach's plexus has been paralyzed by the application of cocaine or nicotine to the surface of the bowel. Peristaltic waves coursing over the normal stomach during digestion have been described by Cannon, Carmen, Cole, Case, Kaestel, Holzknecht and others. There is very general agreement as to the movements of the gastro-intestinal tract during its digestive phase with the one important exception, namely: the activities of the pyloric ring.

The Pyloric Sphincter.—The theory of the acid control of the pyloris was elaborated by Cannon. It was assumed that when the stomach was empty the pyloris remained tonically contracted. It continued to remain contracted until the ingested food attained a certain degree of acidity, when the sphincter relaxed and a small amount of the mixture escaped into the duodenum. The presence of acid in the duodenum was then supposed to cause a contraction of the sphincter. Briefly stated, acid on the pyloric side opens the ring and acid on the duodenal side closes it.

Carbohydrates, proteids and fats pass through the pyloric ring in the order named. Carbohydrates do not combine with hydrochloric acid. From that fact it is reasoned that the first acid secreted would cause a relaxation of the pyloric sphincter. On the other hand, proteids combine with hydrochloric acid; consequently, there is no free acid present for a considerable time after ingestion of proteids. Therefore, carbohydrates pass through the pyloris before proteids.

This theory has been accepted notwithstanding the fact that from time to time the clinicians have called attention to the fact that the stomachs of

patients having high acidity do not necessarily empty themselves more quickly than those having various degrees of subacidity and to the still more confusing fact that in cases of achylia gastrica the stomach empties most rapidly.

Cannon carried out his experiments upon animals, mostly upon cats. Of late a few men have been investigating the acid control of the pyloris in man.

McClure, Reynolds and Schwartz, in a series of twenty-two cases, passed into the duodenum a duodenal tube to inject acid and alkali, of varying strength. Their findings do not agree with those of Cannon in two essentials: (1) neither acid nor alkali, in any part of the duodenum, affect the opening or closing of the pyloric ring after a barium meal, as viewed through a fluoroscope; (2) differential discharge of food through the pyloris in man does not obtain, as it was found that barium meals of carbohydrates, proteids and fats are alike as to time of beginning evacuation through the pyloris.

Lockhart, Philips and Carlson, in recent experiments, found that in the human stomach there exists a relation between the gastric peristaltic waves and the opening and closing of the pyloric ring. When a peristaltic wave passed down over the surface of the stomach the pyloric ring was open for the escape of stomach contents. Upon the arrival of the peristaltic wave at the ring, it contracted and remained so until the approach of another wave. Cole previously demonstrated the same facts fluoroscopically and from a study of serial radiographs.

Wheelon and Thomas measured the contraction of both the pyloric sphincter and the antrum with an enterograph. They were able to demonstrate that both the pyloric sphincter and antrum show cycles of the same duration. The phases differ but show a constant type of alteration. These findings are not in accord with those of Cannon, who found that the pyloric ring opened and closed irregularly in response to chemical stimulation in either antrum or duodenum. That the control is not entirely one of motility is evidenced by the fact that the time required for the stomach to empty itself is influenced largely by the character of food ingested: for example, if carbohydrates only are given, the stomach will be found empty in three hours; fats require very nearly six hours and proteids almost as long. If fats are mixed with either carbohydrates or proteids, the former delay the escape of both. Neither acid control nor motility accounts for these facts.

While apparently not undertaken for the purpose of disproving the theory of acid control of the pyloris, the recent experiments of Boldyreff actually do that. He found, as did Pavlov, that the percentage of hydrochloric acid secreted in gastric juice does not vary. Carlson has more recently confirmed the fact. The first secretion of gastric juice in an empty stomach was found by Boldyreff to contain 0.5 to 0.6 per cent hydrochloric acid. This percentage is rapidly lowered, even in the absence of food, to from 0.1 to 0.2 per cent. The lowering is largely effected through the regurgitation of bile and pancreatic juice. Boldyreff found that a high percentage of hydrochloric acid passing from the stomach causes an irritation and reverse peristalsis in the duodenum so that instead of a hurried evacuation of strong acid contents as should obtain in accordance with the theory of Cannon, there is the partial neutralization within the stomach. This mechanism Boldyreff designates as the self-regulation of the acidity of the contents of the stomach.

All that can be said with certainty at the present time regarding differential discharge of food through the pyloris was stated long ago by Pavlov: "That foods pass through the pyloris in the order in which they are liquefied and prepared in the stomach by the digestive juices acting upon them."

Hunger Contractions.—At the end of digestion the peristaltic waves gradually pass over into the hunger contraction of the empty stomach. They are not at once pronounced. The time of onset, after digestion, depends upon the age and physical vigor of the individual. In infants maximum contractions begin ten to sixty minutes after the stomach is empty; in adults from one to three hours. Carlson found that hunger contractions differ from peristaltic waves in that they begin high up on the cardia, while peristaltic waves have their origin just above the pyloric portion. He found that at times the contractions were so deep and rapid as to resemble the colonic peristaltic rush of Meltzer and Auer.

In this connection it should be stated that we are greatly indebted to Carlson and his associates, Luckhart, Dragstad, Philips, and others of his school, for the painstaking accuracy with which they have worked out many problems relating to gastro-intestinal function.

All normal individuals have at some time felt the pangs of hunger. Cannon and Washburn were the first to associate this sensation with muscular contraction of the stomach. Carlson and one of his associates fasted for five days in order to measure the strength of hunger contractions by means of an inflated rubber balloon placed within the stomach. He found the greatest distress on the third day, although there was progressive increase in the strength of the contractions to the end of the fifth day. These contractions are no doubt the cause of epigastric pain which is complained of so frequently by neurotic patients who take food irregularly and in small amounts. Lockhart and Carlson report cases in which very severe epigastric pains were produced by gastric contraction of the empty stomach in hypersensitive individuals. It is interesting to note the manner in which the theory of hunger pains in duodenal ulcer, as described by Moynihan, coincides with the gastric hunger contractions. It appears to be a clinical fact that when an ulcer is located on the lesser curvature it is the cause of less pain than when situated in more actively motile regions. This, of course, would not be true if complications were present. Contractions of the lesser curvature from the cardia to the incisura angularis are more shallow than those over the greater curvature. Kaestle, Rieder and Rosenthal proved this point by superimposing twelve photographs of a single contraction phase of the human stomach. The resulting picture showed but slight movement of that portion of the lesser curvature throughout the contraction. With ulcer in the pyloric region, where the contractions are strong and deep, the pain is the pronounced feature. The same is true when the ulcer is located in the duodenum. This also may be most plausibly accounted for when it is remembered that movements are normally very active at that point. Furthermore, Boldyreff found that acid escaping from the stomach intensifies movements in the duodenum, which at times are most active and may be reversed.

The Gradient Theory. — As previously stated, gastro-intestinal muscle functions independently of its nerve supply. To account for this fact Alvarez has advanced the gradient theory, which is based upon the fact that muscle has independent function and that there is a graded difference in activity from above downward. It appears that Alvarez has taken over the word "gradient" from the field of biology, where it is applied to the process of development in all forms of life, both plant and animal. Child, in the study of the planarian worm, finds that development proceeds from before backwards and at the point of the greatest cellular activity the head always develops. As development progresses, it is found that the metabolic rate is greatest at the head and lowest at the tail. The metabolic rate is measured by the susceptibility of the embryo to certain drugs, notably potassium cyanide. Child, and also Hyman, believe that oxygen intake and carbon dioxide output are by that method accurately measured.

In applying the gradient theory to the gastro-intestinal tract, Alvarez has carried out a series of experiments over a period of several years. He has found differences in contraction rythm of muscle as well as differences in irritability, in tone, in latent period, and, most important of all, a difference in metabolic rate. In each case, the result always depended upon the section of the intestine from which the specimen was taken. Activity progressively lessens from above downward. For example, the irritability of the muscle at the cardia was found to be greater than that at the pyloris and the irritability progressively lessened from the duodenum to within ten inches of the cecum. The same was found to be true concerning the degree of rythmic contraction of muscle fibres. The power of independent rythmic contraction was demonstrated by experiments upon fibers on the inner surface of the circular layer in which no remnants of Auerbach's plexus are to be found. When placed in oxygenated Lock's solution the fibers begin and continue for some days a rythmic beating, the rate always depending upon the section of the tract from which the fibers were taken.

Alvarez believes the pace-making region for the stomach is high up on the lesser curvature, where the greatest irritability, as well as the highest rate of rythmic contraction, has been noted.

These findings appear to offer some explanation for the reason that V-shaped excisions of the lesser curvature cannot be made without interfering with the emptying power of the stomach as was pointed out some years ago by W. J. Mayo. The truth of this statement has since been attested to many times by surgeons who have attempted the procedure. This theory appears to offer a solution for some other things which have heretofore remained unexplained.

Alvarez states that an ulcer near the pyloris

raises the irritability of that region to a point above that of the cardia with a consequent reversal of the gradient. This results in a delay in the emptying time of the stomach when no real obstruction is present. Again, the behavior of the bowel musculature in intestinal obstruction supplies evidence in support of the theory; if, as the author states, irritation or injury to the bowel will depress or reverse the gradient, it explains why the section of bowel immediately above the obstruction contains only gas and it offers an explanation for the cause of dynamic ileus, that one is at least able to understand.

In conclusion the work of Professor Keith should be mentioned. After a minute dissection of the plexus of Auerbach in many different regions of the gastro-intestinal tract, he was able to convince himself that each of four zones is controlled by a large group of ganglia cells situated within each zone. The theory is of interest because of the eminence of the author, but unaccompanied as it is by physiological studies a detailed résumé of his work will not be made.

CONCLUSIONS

1. The time of opening and closing of the pyloric sphincter is probably not influenced by hydrochloric acid but is governed by the same motor mechanism which controls peristaltic waves during digestion. Hydrochloric acid is an important ingredient of the gastric juice. It liquefies and prepares the food and in that way is an important element in controlling the differential discharge through the pyloris.

2. There is evidence to show that acid causes contraction in the duodenum. The contractions may be reversed, and when they are, the alkaline secretion present in the duodenum is forced backward into the stomach, reducing the acidity.

3. Hunger contractions coursing over a stomach may be the cause of distress or even pain. If there are pathological lesions present the epigastric pain may be intense. The pain is greatest in regions where contraction waves are deepest. Peristaltic waves do not cause the same degree of pain because of the presence of food in the stomach, which prevents an extreme degree of contraction.

4. Gastro-intestinal muscle has the power of rythmic contraction, even when separated from its nerve supply. Auerbach's plexus is, therefore, a conductor and is not an initiator of stimuli.

5. In accordance with the gradient theory a bolus of food passes from above downward for the reason that pressure is greater above than below the bolus, due to contractions of myogenic origin.

6. The gradient may be depressed throughout the length of the intestinal tract because of illness. A single segment may have an increased rate of rythmic contraction because of some irritation in the region of that segment. Reversed peristalsis with complete obstruction may result from a local intestinal injury.

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DIAGNOSIS OF CONDITIONS ASSOCIATED WITH SPLENOMEGALY*

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In nearly all conditions in which the spleen is diseased, it is enlarged sufficiently to be palpated at the costal margin. It is also usually true that a palpable spleen is the seat of disease, except in children, or in the comparatively rare instances of prolapse of the organ. Because of the spleen's physiologic function of blood destruction, this function in disease is often exaggerated and leads to severe anemia.

Even careful examiners often overlook the abnormal condition of the spleen. It may be mistaken for a tumor of the kidney, or for a mass in the retroperitoneal region. A well trained finger is necessary for the detection of the rather soft palpable spleen; if it is hard, with a sharp edge, it may be easily recognized. If it is not palpable by examination in the ordinary position, it may be palpated by having the patient lie on the right side doubled up, much as one lies in bed on a cold night, but with the abdominal muscles relaxed. Obviously the notch makes the spleen distinguishable from tumors of other organs, but this cannot always be felt. An important point in the diagnosis is that the spleen seems to come out almost flush with the costal margin, while a tumor of the kidney or one in the retroperitoneal region may appear to leave a sulcus between the costal margin and the tumor when inspiration forces it down. The spleen usually overrides other organs, while the colon is in front of a renal or retroperitoneal tumor, as recognized by tympany on percussion. Percussion and, par excellence, auscultatory percussion, is a much neglected but valuable method in diagnosis. Palpatory percussion and ballottement are of great value in cases of ascites.

In discussing the differential diagnosis of the conditions associated with splenomegaly, only a few of the main points in the diagnosis of each will be considered.

Cases of splenomegaly may be classified into acute and chronic; I shall discuss here only the chronic cases, the most important of which are those due to myelogenous leukemia, lymphatic leukemia, Hodgkin's disease, chronic malaria, splenic anemia and Banti's disease, hemolytic jaundice, polycythemia vera, pernicious anemia, Gaucher's disease, von Jaksch's disease, syphilis (hereditary and acquired), tuberculosis, kala-azar, chronic infections, Still's disease, purpura, hepatic cirrhosis, obstruction to the portal vein, amyloid disease, and tumors.

The largest spleens usually occur in cases of myelogenous leukemia, Gaucher's disease, and kala-azar. The spleen may be almost as large in cases of splenic anemia or Banti's disease, and chronic malaria. In young children, from one to two years of age, the largest spleen is likely to occur in von Jaksch's disease. It varies in size, but usually is not so large in cases of hemolytic jaundice, polycythemia, syphilis, tuberculosis, Hodgkin's disease, Still's disease, lymphatic leukemia, chronic infections, and so forth. It may, however, become very large in cases of syphilis, tuberculosis, and Hodgkin's disease; in pernicious anemia, and in acute diseases it seldom is large.

Myelogenous leukemia.—The ordinary case of myelogenous leukemia may be easily recognized by the leukocyte count and enlarged spleen. Boothby of the Clinic is making a study of the basal metabolic rate and blood chemistry in such cases, which may be of some service in diagnosis. Thus far he has noted an increase in the basal metabolic rate and in the amino-acids of the blood. In cases in which the total leukocyte count is normal, the cases of so-called aleukemic leukemia, the differential count decides the diagnosis. Patients with a rare form of acute myelogenous leukemia are very ill, usually with a lower total leukocyte count, but many more immature cells. In certain cases in which the spleen is rather small and glands are somewhat enlarged, the diagnosis depends entirely on the differential count, but even so there may be many young cells that cannot be readily differentiated as belonging to the myelocytic or lymphocytic series.

Lymphatic leukemia.—In cases of lymphatic leukemia the lymph-glandular enlargement and continuously high leukocyte count, with 80 per cent or more of lymphocytes, are too well known to need repetition. Here also the total leukocyte count may not be increased, the diagnosis depending on the differential count. In certain cases the splenic enlargement may occur preceding the glandular enlargement, and thus lead to a diagnosis of mye-

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logenous leukemia, especially if the cells are young, or of some other form of splenomegaly if the total leukocyte count is not increased. A number of years ago I observed a case in which the splenic enlargement was the outstanding feature, and at first the total leukocyte count was about 9,000. The high percentage of lymphocytes (about 80 per cent) led to the correct diagnosis even before the glands became enlarged. Before death occurred three months later, the glands and the spleen were markedly enlarged and the leukocyte count was about 90,000. The value of careful study of the cells with regard to maturity should be emphasized, as in this way a good idea can be obtained of the activity of the process. In the acute type of lymphatic leukemia the total leukocyte count often is not greatly increased, and the spleen usually is not enlarged. The acute illness of the patient and the rapidly fatal course of the disease are outstanding features. On the whole, in cases of lymphatic leukemia, the splenic enlargement is not a prominent feature in the disease.

Occasionally a case is observed in which there is a combination of clinical and laboratory evidence of the lymphatic and myelogenous forms, the so-called mixed leukemia. There is likely to be both glandular and splenic enlargement with a moderately high lymphocyte percentage, but also a rather high myelocyte count. At least one case of lymphosarcoma, in my experience (Case A379656) revealed the blood changes of lymphatic leukemia. The spleen was very large; the leukocytes numbered 82,200, the lymphocytes were 92 per cent. After the application of radium, the spleen subsided greatly, and leukocytes numbered 6,900, but lymphocytes were 75.5 per cent. Before the patient died, distinct signs of pulmonary trouble appeared, which were thought to be due to leukemic infiltration of the lung. At necropsy definite lymphosarcoma of the spleen, lungs, liver, stomach, kidneys, intestines and lymph nodes, and a great many mitotic figures were found.

The rather uncommon cases of infectious lymphadenopathy and lymphocytosis should be mentioned here. Many or all lymph glands may be enlarged; the leukocyte count almost resembles that in cases of lymphatic leukemia, except that the lymphocyte percentage ordinarily is not so high. On careful scrutiny of the cells, however, they are seen to be mature lymphocytes, rather than varying numbers of younger forms, as is seen in cases of leukemia. Such cases are extremely difficult to differentiate, and only time can make one absolutely sure of the diagnosis. Case A21154 was of this type. The glands in the neck were enlarged. Leukocytes were 22,600; lymphocytes 80.5 per cent. The patient's tonsils were removed and radium applied to the glands and spleen. Sixteen months later the glands had almost entirely subsided; the leukocytes were 10,500 and the lymphocytes 40.5 per cent. The patient is in excellent health three years after the onset.

Hodgkin's disease.—The spleen is usually not greatly enlarged in cases of Hodgkin's disease. The symptoms are well known, but attention should be directed to the itching that occurs in many of these cases. I often find it necessary to excise one of the easily accessible glands for microscopic examination to clinch the diagnosis. In the so-called splenic Hodgkin's disease in which there may be little or no glandular involvement, diagnosis is difficult. The condition may be mistaken for another type of splenomegaly until operation or necropsy reveals the correct condition. Occasionally lymphosarcoma may present the clinical picture of Hodgkin's disease, and microscopic examination will reveal the condition.

Chronic malaria.—In some cases of chronic malaria, the spleen, as is well known, is large and hard, the so-called ague cake. Held asserts that the organism may be more readily discovered by examining the blood forty-eight hours after the subcutaneous injection of 1 c.c. of 1:1000 solution of epinephrin to force the organisms out of the spleen. Certain of the more serious splenomegalies should not be confused with this disease, as so often occurs. We do not often find, in this part of the country, a very large spleen attributable to malaria.

There is a small group of cases presenting the other evidences of splenic anemia, in which there is a history of malaria, or of the patient's residence in a malarious district. The blood findings in these cases may not be distinguishable from those in cases of splenic anemia. I do not recall, however, any case of this kind in which the organisms were recovered from the blood, and therefore the diagnosis of malarial splenomegaly with secondary anemia is somewhat conjectural.

Splenic anemia and Banti's disease.—The diagnosis of splenic anemia depends on the existence of splenomegaly, varying degrees of anemia of the secondary type, usually leukopenia and relative

lymphocytosis, and the frequent occurrence of gastric and intestinal hemorrhages. Because of the hemorrhages, the condition is often diagnosed gastric or duodenal ulcer, the splenic enlargement, even though considerable, being overlooked or disregarded. It should be emphasized that, in cases of gastric or intestinal hemorrhage, splenic anemia must be eliminated as a cause. In the later stage of the disease (Banti's disease) the existence of a very large spleen and ascites due to the associated hepatic cirrhosis, together with the foregoing findings, usually suffice to make the diagnosis. Sometimes it will be impossible to separate the condition from primary hepatic cirrhosis with splenomegaly. The existence of a large liver and a comparatively small spleen or an atrophic liver with rather a small spleen, especially if ascites is present, favors a diagnosis of hepatic cirrhosis. Occasionally syphilis presents such a picture, as occurred in a case in the Clinic recently (Case A415425). Norris, Symmers, and Shapiro believe that all cases of so-called Banti's disease are due to syphilis. The importance of diagnosis in this disease is even greater than its difficulties, since splenectomy in early cases leads to marked improvement or cure.

Hemolytic jaundice.—This condition may be either congenital or acquired. Its chief characteristics are splenic enlargement, usually moderate, an icteric tinge of the skin and sclerae, the absence of bile in the urine and its presence in the stool. Several members of the same family may be affected. The red cells are much more fragile than normal, as shown by the fragility test in which their resistance to hypotonic salt solution is determined (Ribierre). Schneider's test of the urobilin and urobilinogen content of the bile obtained from the duodenum by a Rehfuss tube is of much value. This test shows a practically constant increase of urobilin and the appearance of urobilinogen, running as high as 10,000 units of the combined pigments, whereas 1,000 units is fixed by Schneider as the upper normal. This increase of urobilin and the appearance of urobilinogen in the bile, is probably the result of increased blood destruction, and the consequent conversion of the liberated hemoglobin into an increased amount of bile pigment. However, the rôle of hemoglobin in the formation of bile pigment is not settled. The appearance of these two pigments and the absence of the normal bile pigments in the urine are of value in the diagnosis. The tests for the fragility of erythrocytes and for abnormal bile pigments are the strongest links in the diagnostic chain of this disease. The number of reticulated cells may also be important, since they reach their highest numbers in this disease, that is, 10 to 20 per cent.

The frequency of gallstone attacks in cases of hemolytic jaundice must be taken into consideration since the jaundice is often attributed to such attacks. In Giffin's series of cases, 58 per cent were associated with gallstones. Needless to say, such jaundice is not relieved by cholecystectomy, but usually completely disappears after splenectomy. Certain of these cases resemble cases of pernicious anemia, but in pernicious anemia the fragility of the red cells is decreased while in hemolytic jaundice it is increased. Usually the spleen in pernicious anemia is not so large, the percentage of reticulated red cells is much smaller, and the urobilin and the urobilinogen values in the duodenal contents are not so high. The apparent good health of the patient with hemolytic jaundice contrasts markedly with his weakness when he has pernicious anemia, but occasionally a patient with hemolytic jaundice may be very anemic and weak. Even the hemoglobin indexes of the two conditions may be similar, but with hemolytic jaundice the color index is usually below 1, averaging 0.8. Occasionally a strongly positive Wassermann reaction is obtained in a case in which syphilis is not otherwise demonstrable. It may be difficult to make a diagnosis in a few cases in which biliary cirrhosis and hemolytic jaundice appear to be combined.

Polycythemia vera.—In polycythemia vera, or Vaquez-Osler's disease, the outstanding features, clinically, are the intense bluish-red or intense red of the skin, especially of the face, and mucous membranes, particularly of the lips and tongue; certain patients appear almost cyanotic. They often have headache and sometimes high blood pressure. The spleen varies greatly in size, and occasionally it is not palpable. It never reaches the enormous size seen in cases of myelogenous leukemia, or Gaucher's disease. The most important laboratory finding is the increased number of erythrocytes, varying from 5,500,000 to 10,000,000, or, as in a case observed in the Mayo Clinic, to 14,000,000. The hemoglobin, by the acid hematin method of estimation, is increased; the readings by the Dare method, however, are often very inaccurate. The blood viscosity is practically always increased, as is the total blood volume, in some

cases being more than twice the normal. Naturally, the cell percentage of the total blood volume is increased sometimes much above the normal of 43 to 45 per cent. In a recent test one patient (Case A405531) had 224 c.c. of blood for each kilogram of body weight, whereas 90 to 95 c.c. is normal. All but 67 c.c. of this was cells. The highest erythrocyte count was 7,080,000, and the acid hematin estimation of hemoglobin was 174 per cent. The viscosity was greatly increased; 1:15 and 1:14.2, at two readings, as compared with the normal of 1:4.5. The leukocyte count in this case was high, at one time 39,800. The principal complaint was weakness, and swelling of the feet. The skin and mucous membranes were an intense bluish-red; the eyes were bloodshot. On account of the increased viscosity, such patients are likely to develop thrombosis, as this man did from puncture of the vein. He died about three years after the onset of the disease.

Brown and Giffin have made some interesting observations on the blood capillaries in cases of polycythemia vera. They found that in many capillary loops the arterial portion is not dilated, but that the venous side of the loop is usually markedly dilated. Polycythemia may be overlooked and diagnosed as a neurotic complaint, unless a careful blood count and hemoglobin estimation are made on all patients with unusually red or bluish-red facies and mucous membranes. In cases of polycythemia of congenital heart disease, the cell and hemoglobin values may also be high, but increased total blood volume may be lacking and the murmurs and other signs of congenital heart disease present. The spleen is seldom enlarged. One recent case, observed at the Clinic, presented the laboratory evidence of polycythemia vera, with the physical findings of congenital heart disease. In certain cases there is a resemblance to polycythemia in the facies, but laboratory evidence and the enlarged spleen are lacking. This condition appears to be capillary hypertrophy.

Pernicious anemia.—In cases of pernicious anemia, splenomegaly is not constant, and is seldom marked. It is distinguished by the almost characteristic blood picture, sore tongue, achlorhydria, paresthesias and other nerve phenomena, and extreme weakness, ordinarily without much loss of flesh. The usual blood picture of low hemoglobin and erythrocyte count, high hemoglobin index, marked irregularity in shape and size of red cells, and the frequent presence of megaloblasts, is too well known to need repetition. Sufficient attention often is not paid to the soreness of the tongue, and its atrophic appearance, the achlorhydria and the neurologic symptoms and signs, and too much is expected of the blood count. By carefully considering these features, diagnosis may often be made long before the blood picture becomes characteristic. Here again the Schneider test of the amount of urobilin and urobilinogen in the material obtained by duodenal tubing, and the examination of the fresh urine for the same pigments may be important, and second only to the findings in hemolytic jaundice, the average in the duodenal contents being about 3,000 units. Individual cases will vary from time to time. The reticulated erythrocytes are likely to be increased to between 2 and 5 per cent. The low leukocyte count and relative lymphocytosis may also aid in the diagnosis; a low platelet count is the rule. Occasionally a case is observed in which the blood picture is that of pernicious anemia, with free hydrochloric acid in the gastric contents, the spleen usually more or less enlarged and neurologic findings absent. This may or may not be another type.

Acute aplastic anemia is often confused with pernicious anemia, and is sometimes classified with it. The rapidly fatal course, absence of glossitis and neurologic symptoms, persistent very low leukocyte count, low platelet count, absence of nucleated erythrocytes, absent or much reduced reticulated cells, and the lack of increase of urobilin and urobilinogen in the duodenal contents and their absence in the urine, serve to differentiate it. The findings correspond to the lesion, namely, a rapidly progressing fatty change of the bone-marrow.

Sprue may be confused with pernicious anemia on account of the sore tongue, diarrhea, achylia and anemia, but may ordinarily be eliminated by examination of the duodenal contents and urine for abnormal bile pigments, neurologic examination, reticulated cell count, and the recovery of the specific monilia psilosis of sprue in the stool.

Pellagra may be confusing because of the sore mouth, tongue, diarrhea and achylia, but also distinguishable by the foregoing laboratory tests, and the characteristic skin changes. The exact relationship of pernicious anemia, sprue, and pellagra is not clear. A patient with pernicious anemia may not be anemic when he appears for examina-

tion, and even though very anemic may be only pale and not the usual greenish yellow.

Gaucher's disease.—This condition is not often encountered. Previous to 1920 there were only twenty-four cases reported in the literature; it is probable, however, that many cases have been overlooked or not reported. The spleen in Gaucher's disease may be as large as in myelogenous leukemia. The conjunctival and microscopic findings are characteristic.

Von Jaksch's disease.—The enlarged spleen in these cases is usually found in children from one to two years of age; it is generally accompanied by rickets, and sometimes by hereditary syphilis. It has no characteristic blood picture, but the large spleen, the age of the patient, and the rickets, usually identify the condition.

Syphilitic spleen.—The enlarged spleen of syphilis presents nothing characteristic in itself and is differentiated by the presence of the positive Wassermann reaction, a history of acquired or hereditary syphilis, and physical evidences of this disease. In a case observed in the Mayo Clinic recently there were symptoms and signs, including gastric hemorrhages, of Banti's disease. Every case of splenomegaly should be investigated for syphilis. The positive Wassermann reaction occasionally obtained in cases of hemolytic icterus and of pernicious anemia does not necessarily indicate syphilis.

Tuberculous spleen.—This condition can only be suspected, but it may occur either as a so-called primary condition, in which case the spleen may be large, or it may occur as a phase of miliary tuberculosis. Tuberculosis elsewhere in the body should not lead to the hasty diagnosis of tuberculous spleen. The condition may even be associated with anemia, resembling pernicious anemia, as was pointed out by Giffin. Its presence should always be suspected in any case in which splenomegaly is not otherwise definitely accounted for. The history of former ascites should excite suspicion.

Kala-azar.—The splenomegaly of kala-azar or Leishmaniasis need not be considered in the diagnosis of splenomegaly unless the patients reside in, or come from districts in India, Africa or Sicily. The diagnosis is made by finding characteristic Leishman-Donovan bodies in the material obtained by splenic puncture.

Chronic infectious splenomegaly.—Many cases of splenomegaly seem to be due to chronic septic infection in various areas in the body, especially the tonsils and teeth, and associated with furunculosis, phlebitis, arthritis, nephritis, and so forth. The diagnosis can be made only by finding infection elsewhere, and excluding other causes. The spleen, in such cases, usually is not large, but it may be enormous.

Still's disease.—The splenomegaly occurring in Still's disease probably belongs to the chronic infectious group. It is a rheumatoid arthritis, usually occurring in childhood and youth, accompanied by splenomegaly, and glandular enlargement.

Purpura.—The splenomegaly occurring in purpura may be classified with the chronic septic infections. The spleen is a menacing factor in the disease, since, as has been recently shown by Brill and Rosenthal, its removal leads to a symptomatic cure. In one case in the Clinic (Case A413241) hemorrhage from the uterus, uncontrollable by any other means, was entirely cured, and the patient restored to apparent health by splenectomy. In such cases the diagnostic features are purpuric spots, positive tourniquet test, low platelet count, markedly prolonged bleeding time, but usually normal coagulation time of the venous blood. The tourniquet test consists in applying the arm band of the blood-pressure instrument at a pressure impeding the venous return, but not preventing the entrance of blood, usually about 100 mm. for three to five minutes. If the test is positive, small petechiae will appear on the skin of the arm.

Hepatic cirrhosis.—Certain of these cases with splenomegaly and ascites do not correspond to the Banti type of splenic anemia, and are diagnosed by the absence of the suggestive blood findings and the occurrence of jaundice. Occasionally, in cases of portal cirrhosis, the spleen is enlarged. The diagnosis depends principally on the enlarged liver, and jaundice without ascites.

Obstruction to the portal vein.—Splenomegaly due to portal obstruction may be suspected when sufficient cause exists, such as carcinoma of the stomach, pancreas or gallbladder, and Hodgkin's disease. Ascites will usually be present; jaundice may occur because of the pressure on the hepatic ducts. The obstruction may also be due to recurrent abdominal phlebitis, and portal thrombosis.

The splenomegalies of less frequent occurrence, such as are due to amyloid disease, tumors, cysts, hemorrhage, injury or twisted pedicle and the acute splenomegalies, will not be discussed here.

GENERAL DISCUSSION

Schneider's test of the urobilin and urobilinogen values of the duodenal contents has thus far been of diagnostic value only in the anemias associated with hemolysis, notably pernicious anemia and hemolytic icterus, increased values occurring constantly in the latter and in about 85 per cent of cases of the former. The total combined values are normally not more than 1,000 units, and the appearance of urobilinogen is abnormal. The presence of urobilin and urobilinogen in the freshly voided urine has the same significance as their excess in the duodenal contents. Care must be taken to test the fresh urine, since on standing, urobilinogen is quickly converted into urobilin. The fragility test is of value only in distinguishing hemolytic jaundice from other conditions. In the normal control, hemolysis usually begins in about 0.42 per cent sodium chlorid solution, and is complete in about 0.32 per cent, while in hemolytic icterus it may begin even as high as 0.6 per cent and be complete at 0.46 per cent; but the average is 0.52 per cent for beginning hemolysis and 0.4 per cent for complete hemolysis. The viscosity of the blood is considerably increased in a number of diseases, but in diagnosing splenic conditions its use is confined to differentiating cases of polycythemia vera; it is practically always increased in this disease. Its normal is about 1:4.5. The blood-volume and cell-volume estimations in the diagnosis of splenic conditions are of value practically only in cases of polycythemia vera. The normal is about 90 to 95 c.c. of blood for each kilogram of body weight, while 43 to 45 per cent of this is cells. Both or either of these may be variably increased in polycythemia vera. The study of the capillaries seems to be of value in distinguishing polycythemia vera from conditions resembling it. A count of the reticulated cells is important principally in determining the degree of blood regeneration, and of practical importance in the diagnosis of hemolytic icterus, in which the values may be 10 to 20 per cent, and in pernicious anemia with values usually of 2 to 5 per cent as against the average normal of 0.3 per cent and normal limits of 0.1 to 1 per cent.

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DISCUSSION

DR. EDWARD L. TUOHY: This very able survey of the spleen is deserving the closest analysis and study. There are only two or three features I would care to emphasize. The one has to do with an observation of a patient that I reported some two or three years ago after a similar report had been made by the Chairman of this Section, Dr. Giffin. These were cases of extreme chronic increases in *normal leukocytes*, so-called "hyper-leukocytosis." At that time I reviewed the literature, and was impressed with the apparent fact that wherever we have hyper-function of the bone marrow the spleen enlarges. That point is deserving of consideration.

Another feature I wish to call your attention to comes to mind because of a remark made by Dr. John Rose Bradford (the man whose name is so identified with the condition of Massive Collapse of the Lung) while giving a clinic in London a year ago. He asked a group of doctors if any of them had ever seen a case of spleno-myelogenous leukemia in its inception, and apparently no one had seen one. In other words, most of them come to the doctor when the spleen is large. I kept that in mind and on my return had it called to my attention by one of my confreres that a patient we had seen on account of discomfort in the upper left quadrant,—a rather indefinite portion of the human anatomy in any case,—returned a year later with a full fledged picture of spleno-myelogenous leukemia, and unquestionably we had not recognized it in the beginning.

I was treating a patient for a very manifest syphilis and

she returned and casually complained of pain in the upper left quadrant. We made blood counts and found that our patient had spleno-myelogenous leukemia with a rather mild increase in blood count. The spleen could just be felt. Under intensive roentgenotherapy and the continuance of the treatment for syphilis that patient has remained in *statu quo* for just about two years. The leukocyte count has never come down to normal and the abnormal relationship of leukocyte still obtains. So I think I can safely answer Sir John Rose Bradford's question and state that I "have seen a case of spleno-myelogenous leukemia in its inception." I saw one previously but I did not know it.

The other feature I wish to call your attention to is that there have been a number of cases in the literature having to do with abdominal injury, followed by damage to the splenic vein, resulting in enlargement or combined with it a condition of gastric hemorrhage as mentioned by Dr. Conner. That must not be forgotten in determining the cause of unusual splenomegaly. The damage to the vein produces enough trouble to lead to thrombus, which in turn is followed by varices in collateral vessels. The spleen is a most interesting organ and it is entirely wholesome to take this broad view of it and make the analysis as given by the essayist.

DR. J. P. SCHNEIDER: I think the doctor is to be congratulated on covering the field so thoroughly. I merely want to touch upon a few points that occur to me. A principle that it is well always to bear in mind is that of the influence of age. Regardless of the pathology causing splenic enlargement, the younger the patient the larger will the spleen become. Hence, ordinary Laennic's Cirrhosis in children will frequently present a relatively very large spleen and often lead to an erroneous diagnosis of Banti's disease.

I was misled by a negro patient, who had a very long-pedicled fibroid in the left hypochondrium and which was mistaken for an enlarged spleen. Particularly in the negro race, fibroid disease of the uterus may give rise to pedunculated fibroids. One further condition that sometimes is mistaken for a primary splenomegaly is a non-hemolytic streptococcic endocarditis with an enlargement of the spleen. I have seen a three hundred per cent enlarged spleen as the result of infarction in this condition. Very frequently the endocarditis will be overlooked.

DR. H. T. HELMHOLZ: I have been very much interested in this paper because of the unusual number of enlargements of the spleen that we have seen in Rochester in children, and one in particular that I should like to recount in view of what Dr. Tuohy just said. A boy of about nine years of age, three years before, had received a 22 revolver shot in the right chest, the bullet lodging opposite the first lumbar vertebra. The child made a perfect recovery and as far as his father knew was perfectly well. He was brought to us and we found an enormous spleen. The spleen extended beyond the midline to the right and to the anterior superior spine on the left and midway between the umbilicus and the symphisis in the midline. Practically every one of the factors that Dr. Conner has brought up could be excluded by examination and the possibility of an injury to the splenic vessels having occurred suggested itself. We thought that that possibly might have been the cause. The spleen was removed and the splenic vessels were found to be intact but there were thrombi throughout the entire spleen.

DR. H. Z. GIFFIN: If as Chairman I may be allowed to say a word, I should like to call attention to two groups of polycythemics in which diagnosis is frequently difficult. The first is the polycythemic with pallor, and the second, one who has become anemic from loss of blood. In these two groups, an accurate history, estimations of the total blood volume and of the red cell volume, and the testing of the viscosity of the blood are most important. The polycythemic who has become anemic from loss of blood may quite easily be mistaken for a case of splenic anemia.

The recent success of splenectomy in severe cases of purpura hemorrhagica is known to all of us, and there seems to be no question that remarkable results have been obtained. It will be a difficult matter to know just when to advise splenectomy. Frequent transfusions are curative in certain mild types of purpura hemorrhagica, but on the other hand, one cannot predict that the case will not prove to be a severe or even a fatal one. The differential diagnosis between purpura hemorrhagica, hemophilia and aplastic anemia is especially important in this connection.

THE ANTINARCOTIC LAW AND CODEIN

A committee appointed by the Ohio State Medical Association to study the habit-forming properties of codein, with a view to determining the need for changing existing law, has submitted to the Council of that Association certain data collected by the committee. A questionnaire was sent to 100 general practitioners and to 125 physicians engaged in special branches of practice.

Of the fifty-seven general practitioners who replied, forty-eight did not regard codein as a habit-forming drug, and nine were unable to express an opinion. Seven reported that in cases of codein addiction the habit was easily broken. Ten regarded it as inconsistent with public interest to exempt codein sulphate from the operation of the Harrison Narcotic Law, thirty-nine wrote that it might be so exempted, and eight were of the opinion while it might be exempted, yet it should in its sale be limited to sales on physicians' prescriptions.

Fifty-eight physicians practicing special branches of medicine replied. Of these forty-nine did not regard codein sulphate as a habit-forming drug, six thought that it would tend to form a habit, and three were unwilling to express an opinion. Eight reported that the codein habit was easily broken, but two were of a contrary opinion. To the inquiry as to whether it is consistent with public interest to exempt codein from the operation of the Harrison Narcotic Law, twelve replied in the negative and thirty-nine in the affirmative. Three, however, would have codein dispensed only on physicians' prescriptions.

In the answers to these questionnaires it was suggested that the infrequency with which codein addicts now appear might be attributable not to the fact that it does not possess habit-forming properties, but to the fact that it is as easy to get heroin, morphin and cocain as it is to get codein, and that if any change were made in the law that would make it easier to obtain codein than to obtain the other drugs, codein addiction might become more common.—A. M. A. Bulletin, Nov., 1923.

RETROPERITONEAL TUMOR*

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There are many organs and tissues occupying the retroperitoneal space, each of which is subject to a variety of tumors. The kidney, suprarenal glands, pancreas, parts of the bowel, the mesentery, etc., may each be the site of development of new growth and therefore of a retroperitoneal tumor and, broadly speaking, the title of the present discussion would include all these growths. This, however, would make the term include such numerous and widely diversified tumors that for practical convenience it is commonly applied to the primary tumors arising from the connective tissue of the retroperitoneal space, either lipomas or sarcomas in their various combinations and modifications. Even in this narrowed sense a comprehensive review of the literature and of all the surgical bearings of the condition would require a much more extended discussion than is permissible for the present occasion.

To bring the subject concretely before the society two cases are reported.

CASE 1. Female, aged 42. Well as a child, menses regular and normal. Has one child aged 5 years, instrumental delivery. Tonsillectomy 1920.

Present complaint: Pain in right hip; unable to walk on account of pain.

History: Had attack of pain in hip in 1918—duration one week, followed by complete relief until January, 1919. Then, without apparent cause, began again to have pain in right hip. Pain was worse when walking. In April, 1919, she noticed a small mass just above the right sacro-iliac joint; it was not painful, but there was a very tender point just below the mass. The tumor slowly increased in size. There is no edema of the right lower limb, but it feels as though asleep at times, and seems colder than the left. Patient has occasional headache. No history of urinary disturbance. No nausea or vomiting. Bowels constipated. The pain is more severe at night and is occasionally transmitted to the knee.

Examination: A tumor is palpable in the right gluteal muscle half the size of the palm of the hand; tense, not tender to touch. Vaginal examination reveals a solid immovable tumor the size of a lemon to the right of the uterus over the sacro-iliac region.

Operation Nov. 14, 1920: Exploratory incision over tumor in right gluteal region. On going through the deep fascia and into the muscle an encapsulated soft tumor of the consistency and appearance of thyroid tissue was encountered. There were several prolongations of the tumor which could be readily shelled out except at the base where they sprang from the vicinity of the sacro-sciatic notch. These masses were removed as far as possible and 50 mgm. of radium was placed against the base of the tumor. Pathological diagnosis—fibro-myxo-sarcoma of very low grade malignancy.

Operation Dec. 10, 1920, on diagnosis of retroperitoneal sarcoma in the right pelvis. Median abdominal incision. A tumor was found behind the peritoneum in the true pelvis, extending downward about 3 inches from the ilio-pectineal line. The posterior parietal peritoneum was incised at the inner side of the internal iliac artery. The ureter and iliac vessels could be seen lying on the surface of the tumor. The tumor was encapsulated and was enucleated without difficulty. At the sacro-sciatic notch it passed out of the pelvis and from this point its extension followed intermuscular planes in the gluteal region. The bone at the sacro-sciatic notch was softened by pressure of the tumor. The patient is still living, but she has had a great deal of pain and a discharging sinus, and a recent report indicates that her condition is unsatisfactory.

CASE 2.—Female, aged 45. Had a miscarriage fourteen years ago, menses irregular. One child living and well, aged 11. Bowels somewhat constipated. No history of previous serious illness. About eighteen months ago she first noticed a swelling in the right abdomen accompanied by a sensation of weight and a "beating sensation." She had no pain in the abdomen, but the fact that there was something present in her side made her very nervous. There were no symptoms of bladder or kidney trouble. Has backache and pain through shoulders and up into her neck. Has smothering sensation when lying down. During the past three months the tumor has grown rapidly and the pain in the back and shoulders has been more severe. She consulted a surgeon several months ago who made a diagnosis of tumor of right kidney and advised an operation.

Examination reveals an extensive nodular, solid, but not hard, tumor occupying the entire lower abdomen, making it about the size of an eight months pregnancy. There is some fluctuation in the lower abdomen when the patient stands—probably free peritoneal fluid. There is dullness on percussion over the entire abdomen except in left flank and over the stomach. The course of the colon cannot be followed. Vaginal examination is inconclusive; the pelvic organs cannot be identified. The tumor was thought to be a multi-locular ovarian cyst.

Operation Jan. 16, 1923: On opening the abdomen an enormous tumor entirely filling the abdominal cavity was encountered. Abdominal viscera were nowhere in sight. The peritoneum covering the tumor was a very thin vascular veil loosely connected to the underlying layer which proved to be the capsule of the tumor and which contained numerous large blood vessels. The uterus, tubes and ovaries were normal. The cecum and ascending colon could not be seen. What appeared to be descending colon was closely attached to the left side of the tumor but could be easily separated from it. The left kidney felt normal. The right kidney was behind the tumor and could not be identified. The transverse colon was attached along the upper border of the tumor. Small bowel was not seen and

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the mesentery could not be identified. The capsule of the tumor was incised and a line of cleavage found between the tumor and its capsule, but in attempting to follow this line free venous bleeding resulted. Exploration for two inches into the substance of the tumor revealed, so far as we went, a pure lipoma. The anatomical relationships are reported as they appeared and were interpreted at the operation, but the true condition will be revealed by the necropsy report. The removal of the tumor was regarded as involving insurmountable difficulties and risks and was not attempted. A few weeks later two tumors appeared in the pericranium. One of these was removed, and microscopical examination showed it to be a spindle-cell sarcoma growing rapidly. Ptosis of one eyelid developed, and physical signs of involvement of the pleurae. Death occurred about eighteen months after patient first noticed the tumor.

Autopsy is limited to the abdomen. The subcutaneous fat is very scant. Presenting in the incision is a large yellowish tumor. It is apparently everywhere covered with peritoneum except on the posterior surface. The tumor fills the right flank, is in contact with the inferior surface of the liver and below with the brim of the pelvis. It extends across the mid-line and has pushed the cecum and ascending colon over into the left flank. Attempt to strip the peritoneum from the tumor is only partially successful for in some areas it cannot be separated. The small bowel has all been crowded far into the left abdomen and is entirely covered until the tumor is raised out of the abdomen.

When removed the tumor weighed 5,075 gm. including the right kidney. It shows a deep depression corresponding to the spinal column. The right kidney has been carried to the left of the spinal column and rotated on its long axis, so that the pelvis of the kidney looks toward the right side. It is almost completely imbedded in the tumor and the ureter lies within the tumor almost down to the brim of the pelvis. The kidney has not been invaded by the tumor, and its capsule can be readily stripped off. The right adrenal lies on the posterior surface of the tumor. The left kidney is apparently normal. There is moderate dilatation of both kidney pelves and of both ureters. The spleen shows no gross lesion. The liver is about normal in size but there is a deep depression in the right lobe due to pressure atrophy. There are no tumors in the liver. There are numerous hard nodules scattered over the parietal and visceral pleurae of both sides of the chest. These nodules extend for only a short distance into the parenchyma of the lung. In the posterior mediastinum is a tumor about 5 cm. in diameter which bulges into both pleural cavities. The abdominal tumor had not dissected between the leaves of the mesentery of the small bowel, but the transverse mesocolon had disappeared and the colon throughout lay in close contact with the tumor. The aorta and vena cava lay behind the tumor but closely covered by it, and the mesenteric arteries passed for a considerable distance through the tumor and between its lobules. There is no edema of the lower extremities. The tumor mass is lobulated. On section it has a variegated appearance. In some parts there are masses 4 to 5 cm. in diameter which are apparently normal adipose tissue. In other parts there are firm grayish-white translucent masses. Other similar areas have a yellowish color. In the center of the tumor is a large mass of necrotic tissue. Microscopically various parts of the tumor show various histological structure. In some areas it is composed of normal adult adipose tissue, in some of fatty tissue of embryonal type. Some parts of it show the structure of spindle cell sarcoma, some of fibro-sarcoma, and in others the structure is that of a myxoma.

The occurrence of two cases within three years in a comparatively small surgical practice indicates that the condition is not so rare as it is commonly supposed to be. On the other hand it is sufficiently infrequent to justify calling attention to this coincidence as an example of a fact often observed that one unusual case is often followed in a short time by another one of similar nature. These two cases are reported not with the hope of presenting any new facts, but of reiterating some that are old, and of calling attention to a condition which is apt to be overlooked. Moreover, a study and comparison of the writings upon this subject, instead of clarifying it, in some respects make it more obscure, and it is almost impossible to compare the statistics and collected cases of various authors, because no two use the same classification and in a collection of reports of cases of retroperitoneal lipomas will be found a considerable proportion of myxomas and sarcomas. The title of this report was therefore chosen advisedly, for it is a question whether even the so-called pure lipomas, in view of their behavior and their pathological relationships, should not be put into a different class from lipomas in other regions of the body; until their exact status is determined, the term retroperitoneal tumor will be sufficiently explicit, for, for practical purposes, it may be usually considered as synonymous with retroperitoneal sarcoma. The literature on this condition is comparatively recent, but is quite extensive considering the small number of cases reported. Virchow, although he mentions the form of fatty hyperplasia which is frequently seen around the kidney in cases of hydronephrosis, renal calculus and other chronic forms of renal disturbance, makes no mention of the definite fatty tumors which are occasionally found in that region. Adami in 1896 was unable to find any general article on the subject of retroperitoneal lipoma in the English language, and after an exhaustive study of the literature was able to collect reports of only 40 cases, to which he added two of his own. Wahlendorf[1] in 1921 collected reports of 165 cases

of lipoma and reports on Adami's cases are included in this series. The latest case report is by Greensfelder and Bettman.[2] On the subject of retroperitoneal sarcoma the articles by Steele[3] in 1900 and 1904 are classical. He collected a total of 96 cases. In April, 1923, Andrews[4] collected the cases in the literature since Steele's report and added 28 cases from the Mayo Clinic, making a total of 142 cases. The two cases reported herewith bring the number of retroperitoneal sarcoma reported up to 144. At this point attention is again drawn to the uncertain classification of these growths. The articles by Adami and Wahlendorf are under the titles of Retroperitoneal Lipoma. In one of the two original cases reported by Adami he found that "in one region * * * an oat-shaped cell growth replaced well formed connective tissue, so that sections from this area presented a markedly sarcomatous appearance"; and in the other "the tumor was found to consist largely of adipose tissue in a voluminous stroma of embryonic connective tissue with abundant nuclei between the fat cells." Of 151 cases tabulated as retroperitoneal lipoma by Wahlendorf, 82 were classified as mixed tumors, 20 presented sarcomatous changes and in 15 there were recurrences after operation, indicating strong tendency toward malignancy in these tumors. It is probable that these published statistics do not correctly indicate the true number of retroperitoneal tumors, and a remark by Hertzler may be à propos: "Few men take any great pleasure in reporting a case in which the diagnosis was wrong and the treatment a failure."

The etiology of these tumors is unknown; hence there has been a great deal of speculation and many theories have been advanced to explain them. The occurrence of lipoma is not related to general corpulency, but on the contrary many of its victims are below average weight and the tumor even when it is apparently a pure lipoma seems to grow at the expense of the normal fatty tissue of the individual. Pregnancy has been regarded as an explanation of the greater frequency of lipomas in women than in men, but no acceptable explanation is given as to how it operates. Mechanical irritation has been suggested, due to the movements of the hollow organs and the pulling on the tissues by their alternate filling and emptying. Nutritional conditions, abuse of alcohol with rapid increase in body weight seem to be a factor in some cases. The lymph glands are undoubtedly the point of origin in many retroperitoneal sarcomas, and Askanazy regarded it as possible that lipoma might also spring from them through some process of fatty degeneration. Inflammatory processes are a factor in some cases. Kornmann found inflammatory changes in kidneys, spleen and liver and concluded that the condition in some cases at least is not a tumor of pure type but is related to inflammatory processes in other organs as well. Finally these tumors, both lipoma and sarcoma, may arise as tumors of the embryonic mesenchymal layer, and this seems to be the most plausible explanation of their presence.

Retroperitoneal tumor is more frequent in women than in men, 72 per cent of patients in Wahlendorf's collected cases of lipomata being women. Among the cases reported as sarcoma, however, the incidence in the two sexes is about the same. A few cases have been reported in children and in one instance a child of one year had a tumor of the pararenal fat that was of prenatal origin. Nearly 90 per cent of Wahlendorf's cases occurred between ages of twenty and sixty. The origin of the tumor is in the abdomen in about 80 per cent; in the pelvis in 20 per cent. Of the abdominal tumors, 72 per cent are lateral; 28 per cent median. They originated from the kidney capsule in 23 per cent; from the pararenal and lumbar fat in 35 per cent, and from the mesentery in 20 per cent. Among the occasional sites in which tumors have been reported may be mentioned the gastro-hepatic omentum, in which Peyrot found a lipoma undergoing myxomatous and sarcomatous changes. Alsberg described a tumor of the transverse mesocolon. Two cases have been reported of tumor of the mesentery of the small bowel; a few cases of lipoma of the broad ligament. Chiari reported one case of symmetrical lipomas developing beneath both ureters. The pathology of these tumors is confused by the fact that they originate in a region where there is a great variety of structures and which is also a frequent site for teratoma.

In tumors classified as lipomas are frequently found areas of myxoid tissue, which is a primitive tissue closely related to and often associated with sarcoma. Even tumors which are apparently pure lipomas frequently recur after surgical removal and thus suggest a tendency to malignancy and raise the doubt whether they are in fact pure lipomas or should not rather be classified as mixed

tumors. The same observation applies also to the other connective tissue tumors of this region, which are seldom of pure type. It is, indeed, a well recognized fact that any one of the group of connective tissue tumors may show areas undergoing conversion into other members of the group. The reported cases show that in these large tumors we may have examples of practically every form of connective tissue from fibrous to adipose and in all possible combinations and admixtures with myxoid, cartilaginous and even bony tissue and that they have a strong tendency to reversion to embryonal type. Hertzler, indeed, favors the view that these tumors, even the pure lipomas, are to be regarded as embryonal in origin and not merely a reversion of an adult tissue to the embryonal type. This view is supported by the fact that in some cases the tumor is known to have begun in childhood and by the further fact that the most frequent location in all the cases reported is the region of the kidney, which is a frequent site for teratoma and tumors of embryonal origin.

From a practical standpoint, it is important to emphasize the fact that all these tumors exhibit malignancy in one way or another, either by reason of their inherent nature or on account of their widespread extensions around important structures, which extensions are ultimately fatal if permitted to remain and at the same time in many cases cannot be successfully removed by operation. The pure lipomas in this region, therefore, should be regarded differently than we regard tumors of the same structure in other localities. The name lipoma arouses in the mind of the surgeon a feeling of confidence and of mastery of the situation which is likely to be severely shaken when he encounters a lipoma of the retroperitoneal space.

Symptoms are remarkable for their absence until the tumor has reached large size. Pain is very infrequent. There is usually no disturbance of the gastro-intestinal or urinary functions. The most remarkable effect of the tumor is loss of weight of the patient. The tumor seems to develop at the expense of the patient's fat and there is usually great emaciation, but without the characteristic appearance of cachexia. When the tumor has become very large symptoms attributable to pressure will develop, such as constipation, interference with respiration, disturbance of urinary function, edema of legs, scrotum or vulva, and ascites.

The correct diagnosis is seldom made before operation. It seems probable that Greensfelder[2] has pointed out the explanation for this failure in many instances to recognize the character of the tumor. He says in reporting a case, "We confess that the condition of retroperitoneal lipoma did not enter our minds." Encouraged by his example, the present writer is constrained to make the same confession. On account of the soft consistency of the tumor which gives a sensation as of fluctuation, the diagnosis of ovarian cyst has been made most frequently. The emaciation without cachexia produced, in the second case in this report, a very good example of the facies ovariana. The error in that case could have been avoided by closer attention to the history and by *x*-ray examination of the ureters, kidneys and colon. These would have shown the dislocations of the right kidney and ureter and of the ascending and transverse colon, producing distorted relationships which could have been caused only by a growth behind the peritoneum and not by any possibility by a tumor within the peritoneal cavity. Of prime importance in the diagnosis is the relationship of the hollow viscera, and especially of the large bowel, to the tumor. The transverse colon crosses the summit of the tumor and the ascending or descending colon, depending on the side on which the tumor originates, is displaced toward the median line or the opposite side. This relationship when demonstrated will exclude tumors of the ovary, uterus, omentum, liver and spleen. A mesenteric cyst is at first lateral, then, becoming larger, is central and points toward the umbilicus. It is freely movable, especially transversely, and rotates upon its axis. It is surrounded by a zone of tympany and has a zone of tympany passing over it. (Steele.) Solid tumors of the mesentery are very movable, but otherwise very closely resemble retroperitoneal tumors. It should be possible, in most cases, to say whether the tumor is behind the peritoneum or within the peritoneal cavity, but of course the physical signs are not characteristic of retroperitoneal tumors alone (using the term in its restricted sense) but are found in any tumor arising in the retroperitoneal space and would therefore apply also to tumors of the kidney, the adrenal, remains of Wolffian ducts, pancreatic cysts, aneurism of the aorta, etc. A full discussion of the differential diagnosis is to be found in the papers by Steele.[3]

The treatment is surgical, for even those tumors which are histologically benign are always fatal,

unless they can be removed. The only exception to this rule is the solid non-malignant myo-fibroma or osteochondroma, which is extremely rare and may be recognized by the history, course and character of the growth. Retroperitoneal tumors in the pelvis present less formidable surgical difficulties than those in the upper abdomen because the anatomical relations are less complicated. In the first case reported here, the ureter and iliac vessels were easily seen lying upon the surface of the tumor. In the upper abdomen, however, the difficulties are much greater. I will beg the indulgence of the society in discussing a subject so elementary as anatomy, but the problems presented in operating on these tumors are largely anatomical. Retroperitoneal tumors are expansile in their growth and dissect along fascial planes and therefore the consideration of the fasciae of this region is of utmost importance. At the outer border of the kidney the fascia underlying the parietal peritoneum divides into two layers, one passing in front of and one behind the kidney. The name of Gerota, who described it in 1895, has become attached to this perirenal fascia. After thus splitting, the posterior layer, or retrorenal fascia, passes inward immediately in front of the lumbar muscles, and at the inner border of the psoas muscle it blends with the fascia covering the bodies of the vertebrae and intervertebral discs. It therefore lies behind the perirenal fat, the suprarenal gland, the renal arteries and veins and the aorta and vena cava. Above the level of the kidney it reunites with the anterior layer and becomes lost in the diaphragm. Extending downward both layers lie close together but do not actually fuse, and, becoming thinner and thinner, are lost in the loose areolar tissue of the iliac fossa.

The anterior layer or prerenal fascia lies beneath the peritoneum, to which it is loosely attached by a delicate areolar tissue. This attachment is so loose that in operating on one of these tumors it is easy to be deceived into thinking, after cutting through the peritoneum and seeing the smooth structure beneath, that another serous membrane has been encountered. This prerenal fascia forms the anterior capsule of the perirenal fat, and therefore bears that same relation to the tumors arising in that space. It passes inward in front of the renal vessels, aorta and vena cava and becomes continuous with the corresponding layer from the opposite side. It lies behind the colon (ascending and descending) and behind the duodenum and pancreas. Where the peritoneum passes in front of viscera (e. g. duodenum or colon), it becomes separated from the prerenal fascia which lies behind these organs. The fascia passes behind the root of the mesentery and of the transverse mesocolon, thus shutting them off from the perirenal space. The superior and inferior mesenteric arteries, therefore, are outside the perirenal space except for the short distance between their points of origin in the aorta and the point where they enter the mesentery. The ureter throughout its course is within the perirenal space and is attached to the under side of the prerenal fascia. This attachment is quite firm and it is probable that in most cases this relationship would be maintained. It should be borne in mind, however, that in its upper course after it leaves the kidney the ureter must necessarily traverse the perirenal space for some distance. When ureter, veins or arteries pass through the tumor, they will always be found in the planes between the lobules of the tumor.

It is evident, therefore, that the prerenal fascia is a most important guide to follow, and fortunately, in a case of tumor behind it, the fascia tends to become thicker than normal and more easily followed. It can be safely incised at the outer side of the colon, thus giving entrance to the perirenal space, and so long as the surgeon is working within this space the dangers will be limited to certain areas, that is, in the mid-line where the mesenteric vessels leave the aorta, and in the region of the hilus of the kidney. A more detailed description of the anatomy and of the technique of operation is to be found in the article by Reynolds and Wadsworth, Annals of Surgery, 1906, vol. xliv.

Andrews (loc. cit.) reports favorable results in several cases of sarcoma from treatment by combined *x*-rays and radium, and states that in some instances the mass has entirely disappeared. He suggests this form of treatment as an aid to diagnosis where sarcoma is suspected.

The prognosis obviously depends upon the size and nature of the tumor. As has been already stated, it is uniformly fatal unless it can be removed. The mortality from operation is about 15 per cent and appears to be about as high for lipoma as for sarcoma. The anatomical relationships and fascial coverings of the tumor render its removal comparatively easy and safe while it is still small, or even if it is of considerable size if it has not

crossed the mid-line and therefore involved the mesenteric vessels, aorta and vena cava. It may be necessary to remove one kidney with the tumor and it is essential, therefore, always to determine the presence and functional capacity of the other.

Here, as in so many other conditions, successful treatment depends upon early diagnosis. Twenty-one of the series of 28 cases reported from the Mayo Clinic were found to be inoperable. These tumors are peculiarly insidious in their growth and the patient is lulled into a false sense of security because his tumor produces so few symptoms, and by the time it begins to cause symptoms it has become so large that removal is impossible.

Finally, as influencing the ultimate prognosis is the fact that many, if not all these tumors, lipomas included, are in reality mixed tumors. Among the 113 operated cases in Wahlendorf's series recurrence was noted in 15, and of these 15 five were lipomas, three fibro-lipomas, three fibro-myxo-lipomas, thus indicating that our usual distinctions between so-called benign and malignant tumors do not strictly apply to retroperitoneal tumors, for recurrence in lipoma and fibroma is contrary to our conception of the nature of these tumors.

The danger which is inherent in a tumor because of its malignant nature cannot be escaped; but the potency for harm which it acquires during months or years of insidious growth can be prevented by correct diagnosis which will point the way to earlier treatment.

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DISCUSSION

Dr. O. W. Yoerg: When Dr. Baxter kindly asked me to lead the discussion of his paper, I asked him why he had chosen me, who had had so little experience along something of that nature. On looking up the literature I found that very little had been written, and the cases were few, as he has already stated. In speaking of sarcomas developed retroperitoneally, developed primarily from the peritoneal connective tissue, you impose a limitation that makes the group small. Most of these cases, from what I could gather, are lymphosarcomas or mycosis sarcomas. The lymphosarcomas seem to predominate and that is probably because you have the retroperitoneal lymph-glands and the lymph-glands in the mesentery, and that would probably also hold true of the mediastinal sarcomas, which are usually of lymphatic type.

As stated, the sarcomas as true types are hard to diagnose. They begin insidiously, without any pain, and by the time they demonstrate any symptoms there is a large tumor covering a considerable space. Lipomas, from what I could gather from the literature, will sometimes reach the weight of 20 to 50 pounds, and are usually not of the pure lipomatous type. The sarcomas when they do develop to that stage where a diagnosis is made—usually on exploratory incision—have reached a size so that they can hardly be removed. If they can be found early while still encapsuled, before metastasis develops, the chance of getting them out efficiently is better. But after they have become so large, the vascularity of the tumor and the proximity of the tumor to the larger vessels and the danger of hemorrhage, and also in removing them the danger of opening up avenues of metastasis and not being able to get all the tumor—due to all this, they are sometimes left in worse condition than if they had not been operated on.

It occurs to me that these tumors could probably be attacked more readily with the deep *x*-ray. We are now using it at Northwestern Hospital. We have had a deep *x*-ray machine there for the past year and a half, and the men there have had some very good results with sarcomas, kidney sarcomas and mediastinal sarcomas, with *x*-ray pictures showing large involvement. By treating them from different positions, the *x*-ray pictures—say of the chest—would be entirely negative afterwards. In these cases it would probably be to better advantage to the patient and to everybody else concerned if the diagnosis could be made and then treated with the deep *x*-ray therapy. The end results would probably be just as good. The end results either way are not good, but the patient would be alleviated of a lot of suffering and probably would get along better, because there is a certain element of danger in operating these cases. The mortality is fairly high in the line of tumors. I think that covers my meager knowledge of the subject.

Dr. S. R. Maxeiner: I would just like to mention pneumoperitoneum as a diagnostic point in these retroperitoneal sarcomas. With the pneumoperitoneum and the patient lying on the face, with a large pillow or block or sandbag under the chest and under the pubes, a lateral picture should show an area filled with gas immediately in front of the spine. With the presence of a dense tumor this area is obliterated, and with the history and physical findings confirmed by the obliteration of this space in a pneumoperitoneum, some of these cases I think can be diagnosed and subjected to their *x*-ray treatment without the necessity of exploration for a specimen.

Dr. R. E. Farr: I just want to accentuate the points made by Dr. Maxeiner regarding the employment of pneumoperitoneum in these cases. Dr. Santy showed a number of years ago the importance of this method in

differentiating retroperitoneal tumors. Another point I might mention is the comparative ease with which low-lying retroperitoneal tumors may be diagnosed by introducing the finger into the rectum.

DR. H. B. SWEETSER: I don't remember offhand having seen one of these tumors posterior to the peritoneum. Of course, we see a good many metastatic tumors that involve the glands, and I know that there is great difficulty in dissecting them out, and you never get them all out. If they can be subjected to the *x*-ray with any chance of success at all, I think that would be the preferable method.

DR. A. S. FLEMING (speaking by invitation): Not being a member of the Society, I was reluctant to take part in the discussion, but when Dr. Sweetser said that he had nothing to say on the matter it reminded me of the fact that I had seen a case that I suspected of being a retroperitoneal tumor, sarcomatous in type, in consultation with him some time ago. That also brings to mind the fact that in the last ten years, while associated with Hillcrest, I think I have had an opportunity to see, aside from the two cases that Dr. Baxter has brought up for consideration, three others, making a total of probably five of these retroperitoneal tumors, sarcomatous in type. Strange to say, one of these cases is alive after five years, and apparently better now than she has been for many years.

The problem of diagnosis depends a good deal on the point of origin, whether it is in the upper retroperitoneal space or in the lower lumbo-sacral region. This case in which the original diagnosis was made of an enlarged kidney, and later on suspected ovarian tumor, I had an opportunity to examine. Naturally anatomically it should have done just what it did; it stayed up there and displaced the viscera, pushed them out of the way, over to the left. It first presented itself as a large kidney, and then as it occupied the whole space and produced emaciation, it produced a typical picture of a large ovarian cyst. That was one of the later cases.

The other cases were tumors, originating in the lower portion of the retroperitoneal space, and presented surface signs appearing very much like tubercular abscesses will after they have followed the fascial planes either down into the pelvis, appearing in the groin, or through the sacrosciatic notch. The case of Dr. Sweetser was of a young boy who had come here from Iowa and reported with a tumor appearing on the buttocks. He dissected down and I think followed that tumor as far as the sacrosciatic notch. I had an opportunity to apply some radium in the pocket, but we could not accomplish more than temporary relief.

The first case of the kind that I recall appeared as a tumor thought to be a tuberculous abscess in the groin. Incision was made into the fluctuating mass, but instead of pus organized tissue was found, that on examination appeared to be sarcomatous. In that case we did not attempt to remove the different extensions of that growth because it went down into the pelvis, and it was very difficult to get access to. We were simply satisfied with applying radium as far as we could follow it. Unfortunately I lost track of that case, after following it for about six months.

The case that is now alive has a very remarkable history. She first reported to the hospital and an exploratory laparotomy was performed, a large retroperitoneal tumor impossible of removal was found. She went home and later returned for some relief from pressure symptoms. It then had made its appearance at the crest of the ilium. Then an incision was made and radium implanted in the tumor. She also received deep *x*-ray and responded very well. After several radiations she developed a sinus leading into the tumor that continued to discharge for a long time and it looked as though there was absolutely nothing further to do. She seemed to get radium fast and *x*-ray fast. About the time we decided she ought to engage an undertaker, she seemed to get better, and she has remained better ever since. That is a little over two years ago.

Another case was of a little girl who reported in her seventh year with a tumor appearing at the buttocks and loin with some flexion of the thigh. That responded to radium for over a year, then became radium fast and failed to respond, and the child died. The peculiar thing about this was that the little girl and the woman both came from the same neighborhood. So they don't seem to be as uncommon as one would be apt to think.

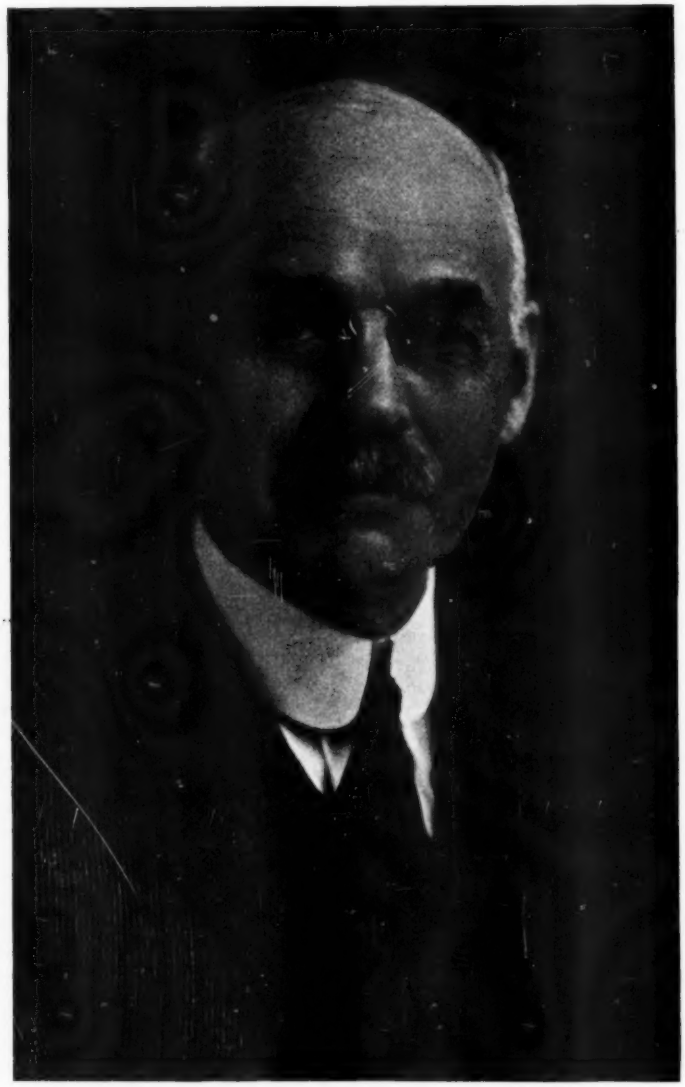
DR. A. W. ABBOTT: I want to call attention to one other condition; I didn't notice Doctor Baxter mention it, but I think he will recognize it because I think he helped me with at least one such case. That was a distended, or rather a misplaced, hydronephrotic kidney which was just above the pelvis. That brings in again the importance of using the usual catheter or pyelogram to make the diagnosis.

I think the Society is to be congratulated on having a paper like this; it is a real classic on this subject.

DR. S. H. BAXTER: In the matter of treatment, I did not go into the *x*-ray treatment very extensively, but these tumors when they are sarcomatous have in some instances eventually responded to deep *x*-ray therapy. Andrews in his report on the series from the Mayo Clinic has even gone so far as to suggest the use of *x*-rays in cases of undetermined tumors as a diagnostic measure, evidently in the same way that we used to use potassium iodide as a therapeutic test for the purpose of determining the nature of some obscure infections.

I think that ordinarily our usual means of physical examinations will enable us to make a diagnosis of a retroperitoneal tumor if only we have it in mind; but in a good many of the cases reported, the condition has not even been considered and that has been one of the reasons why I wanted to present this case because it is rather unusual and at the same time it may not be so unusual as we ordinarily think it is. If we have it in mind and exercise the ordinary means of diagnosis I think most of them can be diagnosed. However, Dr. Maxeiner's suggestion is useful in case the usual means fail and we are forced to resort to the extraordinary means for diagnosis.

The diagnosis is the main thing, because, as I stated in the paper, these tumors are uniformly fatal, regardless of their histological structure; even those that are so-called pure lipomas are always fatal unless they can be removed. So an early diagnosis is a matter of very great importance.



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EDITORIAL

The Proposed New Minneapolis General Hospital

A medical school depends in large measure on available clinical material. The University medical school, not having a large hospital, has utilized half the patients in the Minneapolis and St. Paul City Hospitals for some years past and is likely to pursue the same practice for years to come. Both of these city hospitals are inconveniently located for undergraduate work and with the contemplation of a much needed new Minneapolis general hospital the proposition of locating the new structure near the University campus has been brought forward. This is a matter of interest and importance to the medical men of the state and the medical school itself and should be viewed from an impartial standpoint.

The present Minneapolis General Hospital in the congested downtown district of Minneapolis is too small for the growing city. Like many such institutions, it is the complex and inconvenient result of combining buildings of various ages, constructed without any original far-reaching plan. It is confined to one small block of land and is in a rather smoky and dirty section. The Superintendent and Board of Welfare are certainly correct in their decision that something must be done soon to provide new buildings on a new site.

But where should such a hospital be placed? Its primary function is the care of the poor of the city. For this purpose it should have good physical surroundings; but above all it should have the best staff and nursing service that can be provided. Doubtless, like all the great charity hospitals, it will be dependent on a voluntary staff. It should be placed where it can be reached easily by the busy men of the medical profession. This shuts out distant suburban proposals. The river bank near the Medical School is beautiful and accessible.

A second important function of the hospital is medical and nursing education. By arrangement with the city the University nominates half the staff. Twelve medical students live at the hospital all the time and serve as junior interns. Required clinics, elective clinics, clerkship and extern work of great educational value are carried on there for both Juniors and Seniors of the Medical School. The Pathological Department of the school conducts a weekly pathological conference at the hospital which is of value alike to the staff of the hospital, to the University and to visiting doctors. The interests of undergraduate medical teaching (and this means the broader interests of health and medical service in the city and state) dictate that the new hospital be located as near the Medical School as possible.

The nursing school of the General Hospital is part of the University Nursing School. The pupil nurses get their first quarter's instruction at the Medical School. After that they get practical instruction at the Hospital but go to the University for certain classes. This important work is hampered by distance and would be much facilitated by a location on the campus or across the street from it.

Graduate medical teaching presents the same problem and the same plea. When doctors come to the city to see clinics and take "refresher" lectures their time should be saved. For work toward advanced degrees in clinical specialties

under the Minnesota plan, proximity of clinics and laboratories would spell opportunity and call excellent students. The effect on the staff of the hospital would be good. The University offers to place at the disposal of the hospital its laboratories, library and scientific investigators.

It is not proposed that the location of the hospital near the University would in any way affect its management or policy. The city would control it in every way as it does now. The reflex advantages of co-operation would be mutual. But both the University and the Hospital would retain entire autonomy and independence. This, of course, is legally necessary.

The Board of Welfare has signified its willingness to accept a site near the University. The proposition has met the approval of the Medical Alumni Advisory Board. The University has considered offering a site on the campus. This could only be done with the approval of the State Legislature. The second proposal is that the University through gifts provide other land near the campus on which the hospital may be built. The latter is, perhaps, the better plan and will probably be adopted.

There can be no doubt that this proposition is the most important one in its bearing on medical education that has arisen in Minnesota in many years. If it is settled wrong and the General Hospital is placed at a distance, the mistake can never be rectified. If it is settled right and the immediately needed 600 or 800 beds, followed as the city grows by larger numbers, are placed close to our already excellent medical school, a permanent forward step will be taken, a step toward that coveted goal of making the Twin Cities one of the great medical centers of the country.

Facts and Refraction

A recent article from the pen of our friend, Dr. Brady, concerning the use of cycloplegics in refraction precipitated a spirited controversy in the columns of one of the St. Paul daily papers between two local opticians.

Dr. Brady had mentioned the necessity of using "drops" to refract properly most individuals under forty years of age. This article brought out quite a strenuous opposition from an optician who has been warning the public in his advertisements for some time past of the danger of "drops" and their uselessness, quoting many alleged utterances of authorities to that effect. A reply was published from a second optician, denying the existence of such danger when "drops" are used under the guidance of qualified and competent oculists, insisting on the necessity of using "drops" in selected cases of latent errors, ciliary cramp, etc., and also stating that in his opinion only the law prevented most opticians themselves from using "drops" in refraction. He also dwelt on the advantage of a fundus examination by men medically trained in the recognition of diseases of the eye.

When medical facts are thus distorted and advertised to the public, it is incumbent upon someone to take up the cudgel. In this instance the unpleasant task was spared the medical profession by the reply of the second optician, who by the way limits himself exclusively to filling prescriptions. Here is one instance where the temptation to distort facts in order to do more business was too much for one optician. The desire to sell a pair of glasses on the part of many an optician doubtless inflicts glasses unnecessarily upon many a child who has a slight refractive error. Human nature is so frail that it is well to divorce the two sciences.

The fact of the matter is that most opticians do not concur in the opinion voiced by their confrere regarding the undesirability of a cycloplegic in refraction. At least one optometrist in this section has employed a "Doc" to "stick around" for the purpose of using drops in the eyes of his clients, the distinct advantage of which he advertised in the papers.

Refraction affords numerous opportunities to detect the presence of eye pathology. The eye is not simply a mechanical lens and screen. Take it all in all, the individual ignorant of the diseases of the eye cannot render as great a service as one on the outlook for evidences of local or constitutional diseases expressed in the eye.

No part of a medical examination is so certainly worth while, when indicated, as a fundus examination. Every refraction in the hands of a competent oculist includes this. It is not too much to say that in refraction, more often evidence of unsuspected local and constitutional disease is found than in any other kind of a medical examination.

St. Paul Clinic Week

The dry clinic more than the wet is to be the outstanding change in the program as arranged for St. Paul Clinic Week this year. Clinics and symposia have proven themselves of most value in medical programs and clinics will occupy each morning with a symposium each afternoon. Following the symposia, opportunity will be afforded visitors of hearing outside speakers of national prominence.

A glance at the program which appears elsewhere in this issue will convince one that the selection of subjects has been a happy one. The morning clinics, although fewer this year, are not being published in the journal but will be posted daily at headquarters.

The average physician is a busy man. He cannot take an extended postgraduate course, but he can derive a lot of practical information from clinical meetings of this sort.

Dr. E. W. Buckley

We pause on the threshold of the seventh year of the existence of the journal to pay tribute to the passing of Dr. E. W. Buckley of St. Paul, who may be fittingly termed the father of MINNESOTA MEDICINE.

The story of how the journal was instituted by action of the House of Delegates in Duluth in 1917 is an interesting one. The association committee of five members appointed to investigate the proposition of launching an association journal reported unfavorably at this annual meeting. Dr. Buckley, a member of the committee, after a thorough investigation of conditions in other states, was convinced that the size of the association warranted the publication of its own journal. This opinion, which amounted to a conviction, led him to present a minority report and his presentation of the case led the House of Delegates to undertake the publication of MINNESOTA MEDICINE.

That MINNESOTA MEDICINE has weathered its first six years of existence is fitting tribute to the judgment of Dr. Buckley.

MISCELLANEOUS

WHY DOCTORS BUY WORTHLESS AND FRAUDULENT SECURITIES

BY SAMUEL O. RICE
Educational Director, Investment Bankers Association of America

Physicians who number bond men, investment bankers, among their patients frequently complain that bond men squander their health.

"The heads of three bond houses," my family doctor said to me the other day, "are patients of mine, they and several subordinate officers of other houses, and I'll be hanged if they aren't more careless with their health than is all the rest of my practice put together. They'll work like demons for months at a time and then try to make up for the loss of daily exercise and common sense routine by trying to crowd a year's recreation into a few weeks. They'll eat, and drink, too, a lot of stuff that's bad enough at home, but is doubly damaging when they take frequent business trips with irregular hours, heterogeneous food and the unavoidable strain of an exacting business. They are the worst spendthrifts of health that I know among intelligent men."

"At least they are not as bad as doctors," I replied to my friend's amazement. "When they need medical service you've got to admit they don't go to quacks for it. They go to the reputable profession and to recognized specialists don't they?"

"What has that got to do with it?" the doctor asked. "Physicians can't avoid irregular hours, but they're not—"

"The argument is," I interrupted, "on the use of common sense, isn't it? You say that bond men don't use common sense about health. But as lax as they are in that, they are not as lavish in squandering health as physicians are in squandering money in so-called investments. Bond men at least exercise common sense enough to realize that it requires a doctor to exercise medical judgment for them. How many physicians realize that it requires a 'doctor' of investments to select investment securities dependably? Ever hear of an investment banker being swindled by a quack practitioner? How often are physicians swindled by quack investment schemes?

"There are just two reasons why doctors, as a class, are notable for buying worthless securities. One of them is their failure to realize that in seeking good, sound investments you have to do exactly the same thing you do in seeking health—consult an honest, competent practitioner."

"What's the other reason why we buy worthless securities?" my friend asked with a smile. "Because doctors are not business men?"

"That's the reason usually given, but I don't believe there's anything to it. The second reason is too much optimism.

"There isn't one of you who doesn't believe that next year's practice is going to be a whole lot more remunerative than this year's. Your first years of practice, when you started with nothing and gradually built up your income, taught you that. It's firmly fixed, perhaps subcon-

sciously, in every doctor's mind. It's a life thought-habit of the profession, besides being a somewhat common human trait.

"'Well, if things are going to be better next year, I'll just take a few hundred dollars of the stock of this patent electrical device or in that new serum outfit,' you argue. Thousands of little oil and mining companies have been organized in the last few years among little groups of friends in every town, city and hamlet in the United States and have blown up after losing the money put into them. I'll wager that in every such little venture 90 per cent of them have had one or more physicians as stockholders. As a profession, you are so confoundedly optimistic you let your optimism run away with your better judgment, and you accumulate a lot of nondescript interests in a number of things you know nothing about and that have little or no value when your widow tries to realize on them."

"Yes, I guess some of that is possibly true," my friend admitted.

"True—of course, it's true. Six months ago I had a little ready money and I asked you to send me your bill. I telephoned you twice. I got that bill last week, six months after I had put my little ready money into some sound investments selected by an investment specialist and not by inexperienced friends or an easy-talking promoter. Now, when I'm shy of cash, you optimistically send me a bill. I'll bet you $4 you are going to buy a new car. You are careless about collections, partly because it is in the code of your profession not to be mean and grasping. I honor you for that, but your eternal optimism is also a part cause. Oh, you say, I'll get more money next month; if not from Jones, from Smith. And you base your investments on the same kind of careless optimism.

"I'm serious in this, Roy. You wouldn't have a bit of sympathy for me if I disregarded the common sense that the medical profession has patiently drummed into the public for years, the fact that the public must consult reputable, competent medical advisers. You'd have a silent contempt for me if I let some quack or gaudy fake practice in my family or if I answered a cure-all medical advertisement.

"The so-called intelligent public has learned its lesson in medicine, that of consulting reputable practitioners. It is just as important that the medical public learn the same lesson as applied to investing on money. You nor no other physician can judge an investment security dependably, if you continue attending to your legitimate vocation. Even if you had time to do it, very frequently you haven't the facilities to determine the worth of a security. Investment banking is such a highly specialized calling that I doubt if any man has the ability to perform the investment banker's work without adequate training in the work.

"Physicians should be the first persons in the world to recognize this fact, but strange to say, many of them do not. As a consequence, they are notably heavy losers in bad investments. And the cure for this bad investment condition is the same as in human pathological conditions—consult the reputable specialist who is competent to treat the case."

COMMUNICATIONS

Fergus Falls, Minn., December 19, 192

To the Editor:

The "Proceedings of the House of Delegates," published in the December number of MINNESOTA MEDICINE, should be read by all. The president's address and the committee reports are full of very valuable suggestions. It is a duty and a pleasure to give them careful reading and full consideration. In no other way can one keep in touch with the society's accomplishments and aspirations.

At this time, I wish particularly to call attention to the report of the Committee on Medical Education and Hospitals. Their conclusions were reached after exhaustive study and investigation.

Our medical school is on the verge of becoming one of the greatest in the world. To this end the whole-hearted support of the profession is greatly needed. The recent generous gifts are notable. There are reasons for thinking that the Rockefeller Foundation will meet us half way.

Note the following recommendations of the Committee:

(1) That a state-wide campaign be inaugurated to induce wealthy patients and friends to donate funds to the medical school.

(2) That an effort be made to have the Minneapolis General Hospital placed on the campus.

(3) That plans be perfected for carrying graduate medical instruction to various parts of the State. This is being successfully carried on in several states, notably Pennsylvania.

(4) That the courses for practitioners at the University be extended. That they be given wide publicity and the support of the county societies.

(5) That the profession at large support the law which permits state or county to stand the cost of hospital care at the University Hospital, thus removing this item from the University educational budget.

W. L. BURNAP.

OBITUARY

DR. EDWARD W. BUCKLEY

Dr. Edward W. Buckley of St. Paul was born on a farm in Washington County near Stillwater in 1859. He died September 26, 1923, at St. Joseph's Hospital, St. Paul.

When a child he moved with his parents first to Minneapolis and later to Mankato, where he attended the grade and high schools. He attended Holy Cross College at Worcester, Massachusetts, but left before completing his course and took up telegraphy. Three years later he began the study of medicine at the College of Physicians and Surgeons in New York City. On receiving his medical degree in 1888 Dr. Buckley spent a year at the City Hospital on Blackwell's Island. It was during undergraduate days that a friendship began between Dr. Buckley and his classmate the late Dr. J. W. Bettingen—a friendship destined to be lifelong. At the same time the late Dr. Arthur J. Gillette

was doing post-graduate work in the New York Hospital for Ruptured and Crippled Children and the three St. Paul physicians became fast friends.

On completing his medical training Dr. Buckley came directly to St. Paul, locating in a rather sparsely settled and poor district of the city, on Case street, where he engaged in practice. Early in his career he became interested in fraternal insurance and became active in the Independent Order of Foresters and the Ancient Order of the Hibernians. Later he held various offices in the order of the Knights of Columbus and as supreme physician displayed his genius for organization, and his perfection of the insurance department of the order led to his recognition as an authority in the medical conduct of these societies.

As the organization of the Knights of Columbus increased in size their medical supervision demanded more and more of Dr. Buckley's time and of late years all his activities were directed to this class of insurance. Notwithstanding the increasing demands upon his time he still found time to advise, help and console many of his old time patients.

In 1892 Dr. Buckley was married to Miss Mary Kennedy of St. Paul, who, with a daughter, Margaret, survives him.

In 1893 Dr. Buckley was secretary of the Ramsey County Medical Society and in 1919 became its president. As a member of the Board of Trustees of the Building Fund of the society his experience and advice in financial matters were always greatly valued. It was largely due to the force of his personality that MINNESOTA MEDICINE was launched in 1918 as the Journal of the Minnesota State Medical Association.

For years he was a member of the staff of St. Joseph's Hospital and a few years ago at the reorganization of the staff he was elected Chief of Staff.

During the World War Dr. Buckley went to France and had an important part in establishing and organizing the activities of the Knights of Columbus among the soldiers. In recognization of his war work he was made Chevalier of the Legion of Honor and was personally decorated by Marshal Foch. In the summer of 1921 as a member of the commission which presented the city of Metz with a statue of Lafayette, a gift from the Knights of Columbus, he again visited France and shared the regal entertainment extended the commission by the French government.

It was on this occasion that Dr. Buckley was decorated with the Legion of Honor and with the similar decoration as a Commander of the Order of Morocco, by General Lyanty. For war work in Italy, instituted by the Knights of Columbus during the war, he was made a Knight of Saint Gregory by Pope Benedict VII.

Three years ago Dr. Buckley was appointed chairman of the National Tuberculosis Commission of the Knights of Columbus, which work was under consideration at the time of Dr. Buckley's death.

Dr. Buckley was an honorable and upright member of the medical profession, always ready to take a vigorous part in public affairs affecting the profession and people at large. Being somewhat of a parliamentarian, he rather enjoyed enforcing Robert's Rules of Order when presiding over a gathering. He had a special gift for summing up a situation and presenting in his forceful way his opinion of the correct procedure. His ability as a public speaker enabled him to be a great leader in his chosen field of medical activity but his firm exterior concealed a sympathetic nature which was well known to his many friends.

DR. SAMUEL C. McCORMICK

Dr. Samuel Carson McCormick, aged 86, said to have been the oldest practicing physician in the state, died November 17, after an illness of seven months.

Doctor McCormick was born in Pennsylvania, Sept. 8, 1837. He was a graduate of Lewisburgh university, now Bucknell college. In 1861 he graduated from Jefferson Medical college and was appointed first assistant surgeon in the United States army and served throughout the war. He is survived by his widow and two sons, C. P. McCormick, Seattle, Wash., and W. S. McCormick, of Duluth.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

ST. PAUL CLINIC WEEK

The fourth annual St. Paul Clinic Week will be held Tuesday to Friday, inclusive, January 15 to 18, 1924. Headquarters will be at the St. Paul Hotel.

Clinics will be held at the various hospitals each morning during the session. The afternoons will be devoted to the following symposia and addresses by eminent specialists:

TUESDAY AFTERNOON

Symposium—Intestinal Obstruction

Dr. E. M. Jones, St. Paul—Etiology

Dr. F. J. Plondke, St. Paul—Surgical Differential Diagnosis

Dr. J. A. Lepak, St. Paul—Medical Conditions Simulating

Dr. A. MacLaren, St. Paul—Treatment

Address—Surgical Reconstruction of Certain Excretory Ducts

Dr. Lewis L. McArthur, Chicago

WEDNESDAY AFTERNOON

Sympoisum—Life Insurance

Dr. J. Allen Patton, Medical Director, The Prudential Life Insurance Company of America

Dr. F. L. Grosvenor, Medical Director, The Travelers Insurance Company of Hartford, Conn.

Dr. Robert L. Rowley, Medical Director, The Phoenix Mutual Life Insurance Company

Dr. D. E. W. Wenstrand, Medical Director, The Northwestern Life Insurance Company of Milwaukee

Address—Reconstructive Surgery and Industrial Insurance
Dr. Harry E. Mack, Chicago

THURSDAY AFTERNOON

Symposium—Irregularities of the Heart

Dr. C. N. Hensel, St. Paul

Dr. E. T. F. Richards, St. Paul

Dr. Harold Richardson, St. Paul

Dr. Harry Oerting, St. Paul

Address—Clinical Problems of Chronic Suppuration of the Middle Ear

Dr. George E. Shambaugh, Chicago

FRIDAY AFTERNOON

Symposium—Etiology and Diagnosis of Diseases of the Kidney and Ureter

Dr. E. T. Bell, Minneapolis

Dr. Arnold Schwyzer, St. Paul

Dr. E. T. Herrmann, St. Paul

Dr. F. E. B. Foley, St. Paul

Diagnostic Clinic in Prostatism

Dr. W. F. Braasch, Rochester, Minn.

Wednesday evening a buffet supper has been arranged to be followed by an informal stag entertainment.

Thursday evening the annual meeting and banquet of the Minnesota Academy of Ophthalmology and Otolaryngology will be addressed by Dr. George E. Shambaugh, of Chicago. This meeting is open to all physicians interested.

The final program will be placed in the mail not later than January 5th.

THE MINNEAPOLIS SURGICAL SOCIETY

MINNEAPOLIS, MINN.

January 10th, 1924

NORTHWESTERN HOSPITAL

9:00 to 12 A. M.

Operative Clinics

DR. MANN DR. LAW DR. BULKLEY

DR. POPPE DR. YOERG DR. NORDLAND

Followed by Pathological Conference

DINNER AT MINNEAPOLIS ATHLETIC CLUB

6:30 P. M.

HENNEPIN COUNTY MEDICAL SOCIETY ROOMS

8:00 P. M.

"Surgery of the Gall Bladder"

By DR. E. S. JUDD

ROCHESTER, MINNESOTA

All medical men are invited to attend the dinner and all parts of the program.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY SURGICAL ASSOCIATION

The Minneapolis, St. Paul & Sault Ste. Marie Railway Surgical Association held a full two-day scientific session on December 11 and 12, at Minneapolis, Minn., presided over by President Dr. John V. R. Lyman, Eau Claire, Wisconsin.

The following officers were elected for the ensuing year: President, Dr. F. Gregory Connell, Oshkosh, Wis.; vice president, Dr. George G. Eitel, Minneapolis, Minn.; secretary-treasurer, ex officio, Dr. John H. Rishmiller, Minneapolis, Minn.

The next place of meeting was left to the discretion of the officers.

RICE COUNTY MEDICAL SOCIETY

Members of the Rice County Medical Society held their annual meeting in Northfield, Friday, November 20. The paper of the evening was read by Dr. Walter Rumpf, of Faribault, his subject being "The Treatment of Diabetes."

Officers elected for the coming year are: President, Dr. F. M. Babcock, Northfield; first vice president, Dr. F. J. Lexa, Lonsdale; second vice president, Dr. C. J. Plonske, Faribault; secretary-treasurer, Dr. C. M. Robilliard, Faribault.

SCOTT-CARVER COUNTY MEDICAL SOCIETY

At the annual meeting of the Scott-Carver County Medical Society held at Jordan, December 6, 1923, the following officers were elected for the coming year: President, Dr. F. J. von Bohland, Belle Plaine; vice president, Dr. F. H. Buck, Shakopee; secretary-treasurer, Dr. H. W. Reiter, Shakopee. Dr. F. H. Buck was elected to the board of censors. Dr. H. W. Reiter was chosen to act as delegate to the annual meeting of the State Medical Association with Dr. John Landenberger, of New Prague, as alternate.

STEELE COUNTY MEDICAL SOCIETY

Dr. J. F. Smersh, of Owatonna, was re-elected president of the Steele County Medical Society at the annual meeting and dinner held in Owatonna, November 20, 1923. Other officers elected for the coming year are: Vice president, Dr. B. Melby, Blooming Prairie; secretary, Dr. A. B. Hart, Owatonna; treasurer, Dr. F. M. Smersh, Owatonna. Dr. J. H. Adair, Dr. J. W. Andrist and Dr. A. B. Stewart, all of Owatonna, were elected censors.

Dr. Charles S. McVicar, of Rochester, the principal speaker of the evening, gave an illustrated lecture on "The Diagnosis of Dyspepsia."

WASHINGTON COUNTY MEDICAL SOCIETY

The Washington County Medical Society held its annual meeting at Stillwater, Tuesday evening, November 13, 1923. Dr. H. K. Van Norman, superintendent of the Miller Hospital, St. Paul, addressed the society on the subject of hospitals with special reference to hospital staffs. A report of the state medical meeting was given by Dr. J. W. Stuhr, as delegate.

Officers for the ensuing year were elected as follows: President, Dr. F. G. Landeen; vice president, Dr. J. W. Stuhr; secretary-treasurer, Dr. R. J. Josewski. Dr. D. Kalinoff was elected to membership on the board of censors, Dr. A. E. Brown as delegate to the 1924 meeting of the State Medical Association, and Dr. E. B. Freligh as alternate.

OF GENERAL INTEREST

Dr. O. S. Werner, formerly of South Haven, has located in St. Hilaire for the practice of his profession.

Dr. A. E. Mark, St. Paul, has moved to Los Angeles, Cal., where he will continue the practice of internal medicine.

Dr. Stuart H. Anderson, formerly of Wells, has become associated in the practice of medicine, with Dr. A. E. Johnson at Red Wing.

Dr. J. S. Kilbride, of Canby, who has been doing post-graduate work in surgery in the hospitals of Chicago, has returned to his practice in Canby.

Dr. Carl Goehring, formerly of the Mayo Clinic, Rochester, is now located in Steubenville, Ohio, where he will practice general medicine.

Dr. and Mrs. Haldor Sneve, of St. Paul, who have been in Santa Barbara, Cal., the past few months, have moved to San Diego, where they expect to spend a year.

Dr. R. E. Farr, Minneapolis, addressed a meeting of the McLeod County Medical Society, December 13, on "Local Anesthesia; Its Technic and Clinical Applications."

Dr. Robert Guilmette, of Minneapolis, has become associated in the practice of medicine with Dr. A. W. Swedenburg, of the Swedenburg Hospital at Thief River Falls.

Dr. H. J. Hanson has disposed of his practice at New London and is now located in Minneapolis. Dr. H. S. French, formerly of Grove City, has taken over the practice at New London.

A group of fifty students, three of whom are women, was graduated from the medical school of the University of Minnesota at the all-university commencement exercises of the fall quarter in 1923.

Dr. F. C. Rodda, Minneapolis, associate professor of pediatrics at the University medical school, has been appointed acting head of the pediatrics department to succeed Dr. Clemens Pirquet, of Vienna, who resigned in October after holding the position less than a month.

Dr. H. P. Ritchie, of Saint Paul, was elected secretary-treasurer of the Western Surgical Association at the annual meeting held in Colorado Springs, Colorado, December 6 to 8, 1923. Dr. Donald McRae, of Council Bluffs, Iowa, was elected president of the association.

Following a period of five years of service as medical superintendent of Fair Oaks Lodge Sanatorium at Wadena, Dr. George McLeod Waldie has resigned, his resignation to become effective January 1, 1924. Dr. Waldie will be succeeded as head of the sanatorium by Dr. J. J. McKinnon, of Wadena.

Dr. M. George Milan, formerly medical director of the Oak Park Tuberculosis Sanatorium at Thief River Falls, is now a member of the medical staff of the Warren Hospital, Warren, Minnesota, where he assumed his duties January 1, 1924. Dr. Milan succeeds Dr. W. W. Holley, who resigned recently to go to California.

Dr. Harold Rypins, of Minneapolis, has been granted a year's leave of absence from the University of Minnesota to act as secretary of the New York State Medical Board. Dr. Rypins has in charge the promotion of legislation requiring annual registration of all practitioners in New York. In this way it is hoped that all charlatans shall be driven from the state.

Two Minnesota physicians, Dr. Henry F. Helmholz, of Rochester, and Dr. A. J. Chesley, of St. Paul, were recently elected as directors of the American Child Health Association, of which Herbert Hoover is president. Five others elected to the directorate at the same time are Dr. Louis I. Dublin and E. L. Thorndike, New York; Christian A. Harter and C. O. Williams, Washington, D. C.; and Dr. Henry F. Vaughan, Detroit, Michigan.

At a meeting held in St. Paul the latter part of November, 1923, for the purpose of organizing the Great Northern Railway Surgeons Association, the following physicians were elected to office in the society: President, Dr. P. A. Baxter, of Libby, Montana; first vice president, Dr. R. N. Simpson, Winnipeg; second vice president, Dr. J. N. Cunningham, Spokane, Wash.; third vice president, Dr. Roscoe Webb, Minneapolis; secretary-treasurer, Dr. Harold Hullsiek, St. Paul.

In October, the St. Louis Star succeeded in exposing a ring of diploma venders in St. Louis and Kansas City. The investigation has extended to Connecticut, Arkansas and other states where eclectic boards of medical examiners appear to have found an open door. No purchaser of a bogus high school or medical diploma could pass a properly conducted license examination and this outrageous procedure is simply additional proof of the necessity of a medical examining board of professional standing and personal integrity. Minnesota has not been implicated in this scandal.

The method of sending indigent patients to the University hospital is not generally understood. Any town or county official may recommend that a patient be sent to the hospital. The county commissioner will then have a physical examination made and assure himself that the financial status of the patient warrants state and county (the county pays half the expense) support. Application forms may be obtained from the University hospital superintendent. The hospital will not take mental cases, persons with acute tuberculosis, orthopedic cases, contagious diseases nor chronic cases which will not be relieved by treatment over a definite period.

At the meeting of the Board of Regents of the University held December 11, 1923, the following officers were re-elected: President, Fred B. Snyder; vice president, M. M. Williams; secretary, A. J. Lobb.

Fellowships at the Mayo Foundation, Rochester, were granted by the Board to the following: John G. Anderson, Frederick A. Bothe, Donnell B. Cobb, Granville S. Delamere, Jackson K. Holloway, Russell O. Lyday, Robert Mailer, Alfred L. Mayfield, Norman B. Muhme, Samuel H. Nixon, John Wesley Stinson, Isaac M. Webber, Joseph Daly, Howard L. Sargeant, Knut H. Houck, Christian J. Rohwer, John F. Gipner, Ellis B. Gray, Lillian M. Mayer, Samuel W. Becker, Stephen T. Parker and Donnan B. Harding.

A service to the entire state of Minnesota will be performed by the Child Guidance Clinic, which was opened Nov. 1, at the University of Minnesota for the experimental year during which it will be financed by the Commonwealth Fund of New York.

The purpose of the clinic is to examine, study and suggest treatment for children of abnormal behavior, so that remedial care can begin in early youth before the troubles become too firmly rooted.

Dr. Lawson Lowry has been appointed director. Working with him he will have a staff of psychologists, social workers and clerks, as well as a number of interested members of the medical profession.

Social agencies or the authorities in any community in Minnesota may send children to the clinic for observation. Parents or guardians also may present children whom they would like to have examined.

Following the demonstration year during which the clinic will be at the University, both Minneapolis and St. Paul will establish permanent clinics for child guidance according to present plans.

Attention is again called by the Collector of Internal Revenue to the necessity of exchanging narcotic order forms issued before 1923 for the current issue, as old forms will not be honored after January 1, 1924. In fairness to the druggists it is incumbent on physicians to comply with this regulation. Old forms should be sent to L. M. Willcuts, Collector of Internal Revenue, Federal Bldg., St. Paul, with the sum in cash of two-thirds of a cent for each old form which has been used in the old book.

According to the Harrison Narcotic Law prescriptions issued habitues to keep them comfortable and not in an attempt to cure the habit are illegal. Two exceptions to this situation are cited: (1) in incurable diseases such as cancer, tuberculosis, etc.; (2) in aged and infirm addicts where withdrawal would result in death. In the first mentioned exception endorsement should be made on the prescription that patient is suffering from an incurable disease or (Exception (2) article 117): in case of the second exception statement should be made on the prescription that patient is infirm and aged and drug is necessary to sustain life, or (Exception (2) article 117).

The bureau has never sanctioned the so-called reductive ambulatory treatment of addiction, and rightly so.

The Army is making an intensive campaign for procuring officer material for the reserve corps of every branch of the service. A communication has been received recently from the Surgeon General calling attention to the importance of organization of an adequate reserve corps in the medical corps in order to be prepared, medically speaking, for any national crisis. The reserve corps cannot be called into active service unless a national crisis arises.

The medical reserve corps has room for several thousand more officers—especially first lieutenants and captains. Appointments of first lieutenants may be obtained without examination by graduates of recognized medical schools, who have passed National or State Board examinations. A former medical officer of the Army desiring appointment in a higher grade than that he held while in the service must appear before a board of officers for examination. The stringent requirements heretofore in effect in such cases have been lessened somewhat. A former first lieutenant in the medical corps, during the World War, who served satisfactorily on active duty in that grade for more than six months is eligible for appointment by examination to the grade of captain; also are those officers over 31 years of age now, who served satisfactorily on active duty in the grade of first lieutenant for less than six months. Those former captains of the Army, who served satisfactorily on active duty for at least one year and held the grade of captain for at least three months and whose records indicate that they possess the necessary qualifications for a field grade, may apply for the grade of major. Those ex-medical officers, who served satisfactorily on active duty for at least one year, held the grade of major for at least three months and whose records indicate that they possess the necessary qualifications for the higher grade, are eligible for appointment by examination to the grade of lieutenant-colonel.

Communications may be addressed to Major R. W. Whittier, 400 Kasota Bldg., Minneapolis, Minn.

A dinner was given December 4, 1923, at the Hotel Commodore, New York City, by the Rockefeller Foundation in honor of a group of health officers representing eighteen foreign governments, who for the past three months had been in the United States under the auspices of the Health Section of the League of Nations for the study and observation of various types of public health organization.

Dr. George E. Vincent, President of the Foundation, presided at the dinner. Dr. William H. Welch, Director of the Johns Hopkins University School of Hygiene and Public Health, in the absence of Dr. F. F. Russell, General Director of the Foundation's International Health Board, extended greetings to the foreign visitors on behalf of the public health workers of the United States. The other speakers were Mr. John D. Rockefeller, Jr., Chairman of the Board of Trustees of the Rockefeller Foundation; Dr. Hugh S. Cumming, Surgeon General of the United States Public Health Service; Dr. Linsly R. Williams, Managing Director of the National Tuberculosis Association; Dr. W. S. Rankin, State Health Officer, North Carolina; and Dr. Norman V. Lothian, of the Health Section of the League of Nations.

The visit of these health officials to the United States represents the third general interchange of public health personnel arranged by the Health Section of the League of Nations. The first took place in Belgium and Italy in 1922, and the second in England and Poland during February, March and April, 1923.

In the present group are representatives delegated by their respective governments, among them many of the most eminent sanitarians in the world, from France, England, Italy, Russia, Poland, Spain, Holland, Belgium, Greece, Jugoslavia, Germany, Switzerland, Norway, Mexico, Salvador, Brazil, Chile and Canada.

The system of international interchange of public health personnel was made possible by a contribution to the Health Section of the League of Nations from the International Health Board of the Rockefeller Foundation, amounting to $60,080 a year, for a period of three years. The object of the plan is to bring the public health personnel of different countries into closer relationship with each

other, to effect a mutually profitable exchange of views on health subjects, to make comparative studies of health organization and legislation in different countries, and to promote international co-operation in establishing uniform standards for public health regulations.

NEW AND NON-OFFICIAL REMEDIES

In addition to the articles enumerated in our December issue, the following have been accepted by the Council on Pharmacy and Chemistry:

ABBOTT LABORATORIES:
Butesin.

E. BILHUBER, INC.:
Afenil.
Ampules Afenil.

CUTTER LABORATORIES:
Diphtheria Antitoxin Globulin.
Glycerinated Vaccine Virus.
Gonococcus Vaccine.

HOFFMANN-LAROCHE CHEMICAL WORKS:
Iodostarin.
Chocolate Tablets Iodostarin-Roche.
Chocolate Tablets Iodostarin-Roche 0.25 Gm.

PARKE, DAVIS & CO.:
Carbon Tetrachlorid (Human Use)-P. D. and Co.

Butesin.—n-butyl-para-aminobenzoate. Butesin is the normal butyl ester of 4-aminobenzoic acid. The actions and uses of butesin are similar to those of benzocaine (anesthesin), which is the ethyl ester of 4-aminobenzoic acid (see New and Non-official Remedies, 1923, p. 41, Anesthetics, Local, Difficultly Soluble). Butesin is used as a dusting powder, either pure or diluted. It may be used in the form of troches, ointment, suppositories or dissolved in a fatty oil. Butesin is a white, crystalline powder, odorless, tasteless, almost insoluble in water, but soluble in alcohol, chloroform, ether and in fatty oils. The Abbott Laboratories, Chicago. (Jour. A. M. A., Nov. 3, 1923, p. 1523.)

Diphtheria Antitoxin Globulin.—This product (see New and Non-official Remedies, 1923, p. 283) is also marketed in syringes containing 20,000 units. Cutter Laboratory, Berkeley, Calif.

Glycerinated Vaccine Virus.—This product (see New and Non-official Remedies, 1923, p. 293) is also marketed in packages containing one capillary tube. Cutter Laboratory, Berkeley, Calif.

Gonococcic Vaccine.—A gonococcic vaccine (see New and Non-official Remedies, 1923, p. 304) marketed in vials of 5 c.c. and 20 c.c., each cubic centimeter containing 500 million cocci. Cutter Laboratory, Berkeley, Calif. (Jour. A. M. A., Nov. 17, 1923, p. 1693.)

Afenil.—Calcium chloride urea. A molecular compound of calcium chloride and urea. Afenil has the actions of calcium chloride. It is claimed that when afenil solutions are administered intramuscularly or intravenously, the drug is better tolerated and less irritating than calcium chloride. It is claimed that the intravenous administration of afenil is indicated in hay fever, asthma and other diseases of the respiratory tract in anaphylactic conditions, skin rashes, urticarias and as a means of preventing severe arsphenamine reactions. Afenil is marketed in ampules containing 10 c.c. of a 10 per cent solution of afenil. E. Bilhuber, Inc., New York.

Silver Nitrate Solution in Capsules-P. D. and Co.—An aqueous solution of silver nitrate contained in capsules composed of beeswax with an inner lining of a hard paraffin. The solution is intended for the prophylaxis of ophthalmia neonatorium in the newborn. The solution is marketed in two forms: capsules containing 6 minims of a 1 per cent solution, capsules containing 6 minims of a 2 per cent solution. Parke, Davis and Co., Detroit. (Jour. A. M. A., Nov. 24, 1923, p. 1789.)

PROPAGANDA FOR REFORM

The Menace of "Moonshine" Whisky.—The untoward results of overindulgence in whisky have usually been ascribed to its alcoholic content, although now and then ill-defined "by-products" of fermentation present in the distillate have been charged with a toxicity out of all proportion to the quantities ordinarily present. The indefinite "fusel oil" and furfurol were often designated as the pernicious ingredients. In properly made and suitably aged whiskies, such constituents could at most play only a minor part in the intoxication produced. While alcoholism is less prevalent today than it was a few years ago, its attendant and after effects on its victims are more serious. The impression is broadcast that this is due to the "moonshine" liquor which is being distributed. The danger from the presence of methyl alcohol in "moonshine" whisky is well-known. Its presence is explained by the use of denatured alcohol (which may contain methyl alcohol) in the preparation of "moonshine" whisky. However, the investigation of the federal authorities indicates that ordinarily methyl alcohol is not the pernicious constituent of illicit whisky, but instead the product has been found often to contain a high proportion of acetaldehyd. The "ranker" the liquor, the higher the aldehyd content. (Jour. A. M. A., Nov. 10, 1923, p. 1611.)

The Composition of Some Complexion Clays.—Next to nostrums sold for the alleged rejuvenation of the male, the most popular form of contemporary charlatanry lies in the exploitation of alleged beautifiers for the female. During the last year or two the cosmetic market has been glutted with a veritable avalanche of so-called complexion clays and face packs. The A. M. A. Chemical Laboratory has analyzed the following preparations of this class: "Terraderma-lax," "Boncilla," "Domino Complexion Clay," "Mineralava," "Ryerson's Forty Minute Beauty Clay." The laboratory reports that each of the preparations was a bluish mass of the consistency of soft putty and resembled a mixture of clay and water. With one exception, no substance other than clay, water and perfume was found in the preparations. Domino Complexion Clay contained about five per cent of glycerin and about 0.2 per cent of a salicylate, probably sodium salicylate. The examination indicates that the clays analyzed are not high grade products, nor carefully purified before being used. (Jour. A. M. A., Nov. 10, 1923, p. 1624.)

Pregl's Solution.—It has been stated that Pregl's (isotonic) iodin solution is probably prepared by treating a solution of sodium carbonate with finely powdered iodin. When the iodin has dissolved, sodium chlorid is added and the solution diluted to a definite volume. The product is stated to contain sodium ions, free iodin, iodid ions, hypoiodite and iodate ions—this in addition to the carbonate and chlorid. A proprietary brand of this solution is sold in Germany as "Presoiod." All favorable reports of the therapeutic use of Pregl's solution have had their genesis from apparently biased sources. (Jour. A. M. A., Nov. 10, 1923, p. 1628.)

Iridinol.—The Council on Pharmacy and Chemistry reports that about fifteen years ago "Iridium (Medicinal)" was put on the market by the Platinum Co. of America, and the same company manufactured "Iridinol," which was marketed by the P. H. Potter Chemical Co. (now P. H. Potter and Sons, Inc.), New York. Both products were, at that time, claimed to contain iridium and were marketed for a high price with grossly misleading claims for the efficacy of iridium as a therapeutic agent. Iridium (Medicinal) seems to have been abandoned, but Iridinol, advertised by P. H. Potter and Sons, Inc., as an "ethical preparation" continues to be sold. In the earliest advertising Iridinol was claimed to be a "nontoxic preparation of iridium." At that time the A. M. A. Chemical Laboratory was unable to detect the presence of iridium, and it was concluded that no very large amounts of iridium could have been present. Regardless of the presence or absence of iridium, there is not the slightest evidence for the therapeutic value of this metal in the conditions for which it is recommended by the exploiters of Iridinol. In the present advertising for Iridinol no definite claim is made for the presence of iridium. Instead the agents merely imply its presence. Iridinol is recommended by the exploiters in anemia, rheumatism, specific blood diseases, diseases of the nose and throat, of stomach organs, liver and kidneys, of the nervous system, diseases of children and as a systemic alterative. In view of the long-continued activities of P. H. Potter and Sons, Inc., for the use of Iridinol, the Council authorized publication of a report for the information of physicians who may be importuned to use it. (Jour. A. M. A., Nov. 24, 1923, p. 1807.)

Whooping Cough Vaccine.—In a series of articles on biologic therapy prepared under the auspices of the Council on Pharmacy and Chemistry, W. C. Davison (The Journal, Jan. 22, 1921, p. 242) concluded a review of the use of pertussis bacillus vaccine thus: "In summing up the prolific and somewhat contradictory literature on this subject, it may be concluded that injections of Bordet-Gengou bacillus vaccines may have a slight though unreliable prophylactic effect, and that therapeutic inoculations are of practically no value. Further experiments are necessary to raise this procedure from the limbo of non-specific therapy." The Council on Pharmacy and Chemistry has accepted pertussis bacillus vaccine for New and Non-official Remedies, but states in regard to the usefulness of the product: "The evidence indicating that it is of value for either prevention or treatment is very questionable, and the reports are conflicting." (Jour. A. M. A., Nov. 24, 1923, p. 1809.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of November 14, 1923

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, November 14, 1923, at 8 o'clock. In the absence of both the president and vice president, Dr. Taylor called the meeting to order.

Dr. Taylor appointed Drs. Christison, Burch and McCloud a committee to draw up a suitable memorial for Dr. Warren A. Dennis, one of our past presidents, who had passed away since the last meeting of the Academy.

The minutes of the October meeting were read and approved.

The following case reports were given:

DR. OSCAR OWRE reported a case. (No history.)

DR. HENRY ULRICH reported a case and showed *x*-ray film of a Charcot hip.

Case seen in consultation with Dr. John Sessions. Young man 35 years old who began to limp and have some embarrassment of motion in left hip. Physical examination was negative so far as heart, lungs, etc., were concerned. *X*-ray of the hip showed a large tumor mass and a diagnosis of sarcoma was made. Neurological examination proved it to be a case of tabes with Charcot hip.

The rarity of Charcot hip is the only reason for bringing this case before you.

DR. GEO. DOUGLAS HEAD reported a case of pellagra.

The states of Wisconsin, Minnesota, North and South Dakota are considered as a non-pellagrous area, no well-authenticated cases having been reported. This is in strange contrast to many of the southern states, such as South Carolina, with its 1,000 cases, and Georgia with 2,000 cases, as reported in the 1910 U. S. census.

The following case which I have to report, is of interest, first, because it developed in South Dakota and is the first case to be reported from that area, and, second, because the patient had been deprived of meat proteins for about two years prior to the onset of the disease, and, third, because of the prompt recovery upon a meat diet and the use of cacodylate of soda intravenously.

Mrs. Emil B., 50 years, married, three children, living at Mellette, S. D., was referred to me by Drs. Kleger and McCauley, March 29, 1923, complaining of nervousness, soreness of mouth, diarrhoea, and a dirty brown rash over the forearms and hands. Her family history was negative. One sister dead of goiter. She had always been well until two years ago when she had a lot of teeth extracted, after which she began to feel tired. At Christmas time of 1922 she was very nervous and felt as if she would go to pieces. This feeling of exhaustion increased and in March of 1923 her mouth became sore and red and hurt her when she chewed food. About this time she began having seven or eight loose stools a day, and her rectum pained and burned. At this time also the skin on the forearms, halfway to the elbows, took on a dirty brown, scaly appearance. The rash gradually extended to the back of the hands and fingers. About two weeks after the rash appeared, the skin began to crack about the wrists. She had no headaches but was

confused in her mind and slow in her speech and thought. Her eyesight became blurred. She could not concentrate her mind upon whatever she might be doing. The diarrhea had stopped about two weeks before the examination was made. She had lost 25 pounds in weight. She stated that she had lived in the town of Mellette, S. D., for the last forty years, that she had in no way changed her diet or mode of living until after the teeth were removed two years before, when she stopped eating meat and had eaten soft foods, such as milk toast, cream of wheat, potatoes, carrots, cabbage, bread and butter, cream, cooked fruits, grapefruit, soft puddings, cake and pie.

The examination revealed a fairly well-nourished woman of rather stocky build, brown hair and eyes. Her color was a pasty white, somewhat suggestive of myxedema, or possibly early pernicious anemia. Pupils reacted to light and accommodation. Knee jerks were active. No incoordination. Her speech was slow and her mental responses sluggish. The mucous membrane of the lips and gums and inside of the mouth and the tongue was fire red, as shown in the color plate. There was a fine, whitish exudate, like that accompanying the spirillum of Vincent infection over the roof of the mouth and the jaws. This was easily wiped off. In places the mucous membrane hung down in folds. A remarkable crusty, dirty brown pigmentation and rash was present from about the middle of the forearms downward, extending over the backs of the hands and on the proximal parts of the fingers, as shown in the water color drawings. On the inside of the wrist the skin was cracked and red in the crevices. The rash had a rough, raised feel and a bran-like exudate could be rubbed off. The rest of the body was free of this skin rash, except a scaly, brownish area, the size of a dollar, over the dorsal surface of the right foot. There was a scaly, dark brown pigmentation and rash about the anus, and the mucous membrane of the rectum was red and angry looking. The rest of the physical examination was negative, except that there was some difference in the muscle strength in the extremities, the left arm and leg being stronger than the right. The urine findings were negative except a trace of albumen and an occasional narrow hyaline or granular cast. The blood findings showed a fairly high grade secondary anemia, hemoglobin 65 per cent, red cells 3,296,000 and leucocytes 6,250. Differential count: P. M. N. 70.0, small monos. 19.5, large monos. 7.0, trans. 0.5, eosinos. 2.5, myelocytes 0.5, no nucleated reds seen, no polychromatophilia, no basophilic stippling, no anisocytosis. Wassermann test negative. Blood pressure 132 systolic, 90 diastolic. Smears from the exudate upon the gums and roof of the mouth showed no spirilla of Vincent, but a long bacillus and diplococci.

A diagnosis of pellagra was made and the patient placed upon a liberal meat diet, with beef juice, and daily intravenous injections of freshly made cacodylate of soda, two to five grains to the dose. She improved steadily but slowly. She was dismissed from Abbott Hospital on May 21st, less than two months after her admission, the dermatitis and pigmentation gone, the mucous membranes free of redness and irritation, the weakness and exhaustion much improved, and her anemia corrected to a large degree. A letter from her in July reports no recurrence of the rash or other symptoms.

Dr. Joseph Goldberger, of the U. S. Public Health Service, the recognized authority on pellagra in this country, and Dr. John Butler saw and examined the patient and the plates near the close of the treatment and pronounced the condition a case of true pellagra.

DISCUSSION

DR. CROSS: As Dr. Head has just said, the Northwest is not supposed to be a pellagrous area. There have been several well-authenticated cases of pellagra, however, in recent years which must have originated in the Northwest. Dr. Chas. Granger diagnosed such a case in Rochester about five years ago which was reported in full in the Journal-Lancet. The outcome of this case I do not remember, but I believe it recovered.

Two years ago I saw a woman in Red Wing, whose condition admitted of no question as to her being afflicted with pellagra. She was 52 years old and had lived her entire life in Idaho, with occasional visits to Minnesota. Up to four months before my examination of her she had been a strong, healthy woman, living in the pine country where her husband was foreman in a lumber mill. An operation four months before she was seen by me, for gallbladder trouble had resulted in a normal convalescence and return to Idaho. She did not recover her normal strength; in fact became weaker and more somnolent. When seen a few days before her death she was supposed to have uremia. It was difficult to get any reply although she was attentive and seemed to understand when questioned. There was no coma, no pain. The typical pigmentation of the hands and forearms was present, as were also large purpuric spots on the thighs, arms and chest. The history was typical. No autopsy was obtained.

Dr. Head has spoken of the possibility of other dietetic factors, as for instance a lack of protein. The case above stated, of course, during her convalescence was on a very limited diet for some time. The interesting thing to me is that she had never been south of our latitude.

DR. W. A. JONES: I recall a case that came under my observation two years ago. She came from Indianapolis, and was brought to the hospital suffering from protracted diarrhea, excoriation which covered the buttocks and surrounded the anus, discoloration of the skin which was fairly well marked and characteristic, and a peculiar mental state, a dementia, which I believe is quite common in pellagra. I gave her hypodermics of emetin, put her on a proper diet, and she made a recovery from the pellagra and the mental condition. One interesting point was that she was a morphinist before the pellagra developed. The emetin was given for its psychological effect as well as its effect upon the diarrhea.

DR. HEAD: I think that Dr. McCauley, of Aberdeen, made a tentative diagnosis of pellagra before this case was sent down, and our studies were really only confirmatory of the diagnosis which he had made.

I was very glad indeed that we were able to get the opinion of Dr. Goldberger, because he had stated while he was here that he was doubtful about our having pellagra in this part of the country, and one of the cases which he had come on here to see (a case from Duluth which Dr. Butler had seen) he had pronounced a non-pellagrous case. This case he did not hesitate in pronouncing pellagra after talk-

ing with the woman and seeing these plates and getting her history.

DR. MANN: Did Dr. Goldberger say anything about the cause of it?

DR. HEAD: Dr. Goldberger talked very freely about the research findings which had been carried on under his direction in the South, and he is firmly of the opinion that an alien protein, or the absence of certain proteins in the food, have considerable to do with the disease. He does not think that the older conception—abnormal products in the corn—are causal factors. He believes there are many proteins that may act in a causative way to produce it.

DR. PAUL COOK: I just want to say that there is a typical case of pellagra in the Aberdeen Veterans' Hospital, in St. Paul; at least the case was there three or four weeks ago. This case is of a severe pellagra-typhosus type, with gauntlet-like dermatitis.

DR. E. L. GARDNER read a paper entitled "Hypothyroidism, with Special Reference to Minor Thyroid Deficiencies."

DISCUSSION

DR. L. C. BACON: This excellent paper is so exhaustive and covers so completely the subject that the only discussion which seems proper is to speak of a case of myxedema, which I have been able to follow for over thirty years, because it emphasizes some of the points of the paper.

I saw her first during the early '90's; she was 37 years of age, with the history that she had borne five children and at 33 years of age she passed the menopause. Her husband told me that earlier in life she had been of a happy disposition but when the menopause came she became "dull and foolish." She was a large woman with puffed face, eyelids and lips especially so. The skin was pitted, lips and gums bluish, hair was dry, thin and short, and her expression and actions denoted stupidity and lack of vigor. Constipation was obstinate and she complained of a constant dull headache.

About this time I had been reading, in the London Lancet, the report of the British Commission to investigate myxedema, and I considered this a case of the disease in question. I obtained fresh sheep's thyroids from South St. Paul and had her eat them. The improvement was immediate and marked, and in about four months there was a restoration of the menstrual function, which continued until the late forties. She is a little past seventy now and is happy and hearty for her age.

Some months after I first saw her, thyroid extract came on the market and she has used it in tablet form since. During the first few years of the use of the thyroid extract, when she would reach a point of feeling very well, she would discontinue the remedy and would soon become very constipated and her dull headache would reappear, or if she were taking the tablets and the headache and constipation appeared it would be a warning that that particular lot of tablets was inert and fresh would be obtained. Sharp headaches with rapid heart action would warn her that she was taking too much of the extract and the amount would be reduced. After she understood that she must accept a life sentence and took the extract regularly she remained in good condition and she has enjoyed a happy, cheerful life. She finds that one-half of a 5-grain tablet twice a week about meets her needs.

About five or six years ago I did a cholecystectomy on this patient and she did very well. The wound healed promptly, but about two weeks after the operation the scar became red and infected and suppuration occurred. The thyroid had been overlooked during the period, but when exhibited again, healing was prompt and satisfactory.

DR. H. L. ULRICH: I think Dr. Gardner has shown us very beautifully the variation of the potency of the commercial extracts we have on the market. The basal metabolic rate determinations show the importance of this point, that one must have active extracts to get therapeutic results. There are a good many clinicians who scout these mild types of hypo-thyroid states. Those of us who are on the lookout for these are convinced that there is such a condition, particularly after the fourth decade of life. In regard to the heart: there is no question in my mind that there is such a thing as a myxedema heart, and that these hearts are going about with the diagnoses of myocarditis, valvulitis, etc., whereas there are purely functional changes in the hearts. In hypothyroidism the general muscular tone of the body is depressed and so likewise the tone of the heart is depressed. If you examine these patients with the x-ray you find their hearts hang way down in the chest like a drop-heart. We have just had such a case in the hospital with all the signs of hypothyroidism. There was a blocking in the Q. R. S. complex in the electrocardiogram and this patient had been diagnosed a myocarditis. Under medication of thyroid the insufficiency of the heart has disappeared, she has regained a normal electrocardiogram and all the other symptoms have disappeared.

DR. W. P. LARSON gave a paper entitled "The Problem of Wetting Bacteria." There was no discussion of this paper.

The meeting adjourned.

JOHN E. HYNES,
Secretary.

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Stated meeting held November 8, 1923, the President, J. M. Hayes, in the chair.

The guest of honor, Dr. C. H. Mayo, favored the Society with a few remarks before departing to take part in another program.

Dr. J. F. Hedenstrom presented a case of splenic anemia which had been operated by Dr. Wilcox.

DISCUSSION

DR. A. W. WILCOX: I think our pediatric division at the General Hospital is to be congratulated upon the complete records of this case of splenic anemia which has been so ably presented by Dr. Hedenstrom. The diagnosis is the result of minute study and keen interest in the work.

The surgical aspects of this case are entirely technical. The diagnosis was made before the patient was transferred to our surgical division, although we had an opportunity to observe the child for some time for operation. One who has observed this child for some time before operation and since operation can hardly believe it is the same

patient, the clinical improvement has been so marked following splenectomy.

In surgery of the spleen, with few exceptions, splenectomy is the only operation done. Occasionally abscesses have been opened or tumors removed but the essential surgery is confined to splenectomy.

Regarding the operation the approach to the spleen can be most practically made by incision through a left rectus incision, although other incisions are recommended, such as transverse incision or incision parallel to the costal margin.

In this particular instance a left rectus incision was selected and excellent exposure of the spleen was obtained. On opening the abdomen some free fluid was found. This was interesting on account of the fact that the child had several intraperitoneal transfusions. The omentum presented a large hematoma in the upper left quadrant, and in addition to this several adhesions between the coils of the small intestines and rather marked fibrous adhesions between one of the coils of the intestine and bladder. The diaphragmatic surface of the spleen was rather firmly fixed to the diaphragm. These adhesions between the spleen and diaphragm were separated and the spleen brought downward, the gastro-splenic omentum on its anterior surface then divided. Although this was easily done there were some places where the adhesions which were rather firm had to be divided by scissors. The spleen was then rolled toward the midline. This gave an opportunity to dissect away the peritoneal adhesions existing between the spleen and left kidney, and also by dissecting close to the splenic tissue the splenic vein and artery came into view and also the tail of the pancreas. Further dissection of these tissues brought the pedicle with the vessels into plain view. The spleen was now quite mobile and the pedicle ligated in two portions and removed.

Another interesting point was the fact that the essential peritoneal covering of the spleen was easily removed from the splenic tissue proper so that when the spleen was removed it looked like a freshly prepared anatomical specimen. Its weight was 160 grams. The histological and pathological reports have not been finished.

In this particular case the technic proved very simple. The essential factors to recapitulate were: (1) complete freeing of the diaphragmatic surfaces; (2) division of the gastrosplenic omentum; (3) the dissection of the posterior surface without injuring the pancreas and exposing the blood vessels.

The child's present appearance, which I thought it would be interesting for you to observe, speaks for the great improvement and its general condition since the operation.

REPORT OF THE TRI-STATE MEETING

Dr. R. E. Farr: As all of you know who have read the program of the Tri-State meeting, which was just held at Des Moines, this was one of the most successful adventures of this kind ever carried out. Almost every disease that the practitioner comes in contact with was discussed and brought up to date by experts. It was the greatest galaxy of stars I have ever seen on a program. The large auditorium was usually well filled by seven o'clock in the morning and all four evenings were taken up. I talked to this audience at the end of the thirteenth hour of work on the first day and there was still a large crowd in attendance. It means that men from all over this part of the country are hungry for post-graduate work.

The meeting was very well handled and as a rule the speakers were held strictly to their allotted time. I might illustrate its excellence by referring to the clinic of Joslin given upon diabetes. About fifty patients with diabetes were sitting upon the stage. Dr. Joslin illustrated his talk and drove home the points by quizzing the various patients and showing how well trained they were in the handling of their own disease. To illustrate the knowledge of the layman who has diabetes compared with that of the average doctor Dr. Joslin asked a doctor in the audience how much sugar an apple which he held in his hand contained. The doctor estimated the amount at one gram. He then asked a little girl of seven the same question. She estimated the amount at fifteen grams. The apple was weighed and it was found to contain sixteen grams of sugar.

The doctor asked another child to step forward and demonstrate the method of examining the urine. He illustrated practically every phase of the disease by the case of some patient who was present.

There seems to be no question but what the medical profession is demanding this sort of entertainment and yet I cannot resist the feeling that there is a possibility of such meetings interfering greatly with the program of our State and County Medical Associations. Dr. Evans of La Crosse told me that the same territory which sent but three men to the Wisconsin State Medical meeting contributed at least twenty to the Tri-State meeting. I think it is well for all of us to have in mind the ultimate effect of this sort of thing upon our national associations.

There are, as you know, two methods of arranging programs. One consists in gathering together specialists from different parts of the country who present their subjects in an extremely attractive manner. The other is the plan carried out by our State and County Medical Societies in which the local members furnish the program almost entirely. Now, provided such programs as that furnished at the Des Moines meeting are presented with sufficient frequency, what effect will it have upon our State and County meetings? In the last meeting of our County Society the attendance was extremely slim. One viewpoint of the general practitioner may be illustrated by the statement made by a man from northern Wisconsin who attended the Tri-State meeting. He said that he considered that he had made a great mistake in spending his time and money attending the State Medical meeting at Milwaukee this year when with very little greater expenditure he could have attended the Des Moines meeting. His idea was that he had practically wasted the time and money spent attending the State Medical Association.

In Ohio they have a plan known as the Dayton plan, which has been followed out for a number of years. The members of that district pay $10 per year. The lecturers are paid at the rate of $100 a day and expenses. Six fifty-minute lectures are given for a period of four days. I appeared on this program in October of this year and

found that the Association now numbers two hundred and fifty men and that every man was in his place throughout the four days.

I feel that we should be extremely careful to guard the interests of our County and State Medical Societies which are, as you know, the component parts of our national organization and that every effort should be made to develop as many of the men in the profession as possible. Should the pendulum swing too far the other way I doubt if it would bring the greatest good to the greatest number, which is, of course, what we desire.

REPORTS FROM THE RECENT CLINICAL CONGRESS OF SURGEONS HELD IN CHICAGO

DR. H. B. SWEETSER: If I had thought of bringing some new light to you, I would probably have paid more attention to the stage than I did. The first two days the clinical congress of surgeons was confined to a consideration of hospital matters, and that to me was of very great interest. Here a great many surgeons from all over the country had assembled for the purpose of getting some light on surgical matters. But although they were having clinics every place they spent practically these first two days in this general meeting room in the hospital conference. The auditorium there must have contained probably fifteen hundred people, I think, and it was crowded from early in the morning until they closed at six o'clock. Their discussions were on ways of improving hospital methods. Not only were the men there but they stayed there from morning until night. Not only that, but they discussed all the various activities of the hospital; they discussed members of the staff; nursing problems; interne problems; equipment for the hospital; *x*-ray; different kinds of laboratories, etc. The discussion was general. They had conferences, and one man presented something and then it would be discussed from all parts of the hall by men from all parts of the country. They all seemed to talk intelligently; they were all interested.

Some of the things they discussed were whether they would have a single charge for laboratory tests or whether they would charge for each test; and there was a division of opinion there. They discussed tonsil cases. That was a long discussion: whether the children for tonsillectomy should be brought in the night before or whether they should be brought in that morning and then operated upon. There was a great difference of opinion about that. Some thought that they should be brought in in the morning. Some said that would so disrupt the families that it could not be done, and it was not necessary. Then they read the standings that were given to the various hospitals throughout the country. In 1918 only 12 or 13 per cent came up to the required standard; in 1923, 86.1 per cent. You see the hospitals have met this requirement for standardization with a great deal of enthusiasm.

The last day they had a model staff meeting. There was a good deal said about staffs: how the hospitals should treat them, etc. The Evanston Hospital put on what they called a model staff meeting. The members came out and spread themselves around the stage and the presiding officer announced: "This meeting probably will be a little more harmonious than it ordinarily would be if we were not on exhibition." It really was very much more harmonious than any staff meeting that I have ever attended. He called upon somebody to make a report; the report was made and it was adopted without any discussion. One man reported on the deaths and among them was one very badly-treated case. It was criticized and they came to the conclusion that he should be informed by the secretary that he would have to do better. Just what method they had of making it better I don't know.

They divided into business meetings and into scientific meetings. The business meetings were held at the University Club in Evanston; the scientific meetings were held at the hospital. The Board of Trustees were not invited to their business meetings, apparently; and they all recommended things for the consideration of the Board of Trustees.

Every year they have a social meeting; I thought that was a good idea. They invite their wives and they have a dinner and they have a very pleasant time at that social meeting. There are certain dues: the older men pay $25 a year; the junior men pay $20 a year. That money goes for paying for the dinners and also for maintaining the library. They have thirty current journals in the hospital. I think that is a mighty fine idea. The social meeting gets the doctors together in that way with their families, and the library provides proper medical literature for the internes and for the staff.

DR. O. W. YOERG: Dr. Kanavel gave a very interesting and instructive clinic on surgery of the hand.

The first operation was performed on a man who some time previous had had a severe infection involving the index finger and with a resulting loss of the power of flexion of the finger. The operation was performed under local anesthesia. On incision it was found that a good deal of the tendon had sloughed out and new tendon was made by making incisions laterally through the scar tissue, conserving a band of scar tissue, which were allowed to remain attached to the distal and proximal ends to the tendon remaining. A flap of fat was loosened and brought under this constructed tendon. The scar tissue tendon was then shortened, so that the finger could be flexed to almost right angles at the metacarpophalangeal joint and the distal joints were held slightly flexed. This overcorrection he says was necessary to obtain full function. The wound was closed and the hand placed on a splint.

Dr. Kanavel told of making new tendons with twisted strands of silk, interposing between the ends of the missing tendon, and adding to the strands of silk any scar tissue available. He laid stress on early motion in these cases, beginning in three or four days after operation and gradually increasing in amount. This early motion was demonstrated to him by a patient on whom he had done a similar operation, the making of a tendon for a thumb. She had been sent home with instructions not to use the thumb for at least six weeks, but on returning to see him six or eight weeks later perfect function had been restored. She stated that she had not followed his instruction and had used her hand playing a piano.

A second operation was done for suturing of a divided median nerve.

Cases showing late results of tendon making were shown and methods of tendon suture were outlined. A case of a boy who had been some time ago operated upon for webbed fingers was presented. The operation performed on this boy had been done by making a flap of the palmar surface of the web and bringing it back between the fingers and suturing the flap on the back of the hand.

Doing skin grafts on the exposed sides of the fingers. Dr. Kanavel told of his method of operating on cases for palmar infections, in which the flexor tendons were bound down, so that the fingers could not be flexed. He removes all the scar and a good deal of skin from palm of hand, loosens up the tendons from the underlying structures, brings the hand back and places it in a pocket, made by two horizontal incisions on the back. A separate flap of fat is made from the loosened skin of the back and this flap is slid underneath the tendons and the skin over them. The hand is kept sutured to this flap, which is attached above and below, and in about two and one-half weeks the flap is cut away from its upper and lower attachments and finally trimmed to fit the hand. Motion is started early.

Dr. A. F. Bratrud: Dr. Lespinasse at Wesley Hospital gave a demonstration of the results of the removal and transplantation of glands in chickens. It was very interesting from a scientific point of view only. In one case, there were two chickens. One had the typical appearance of an ordinary hen and the other had the typical appearance of a rooster. He made the statement that these two chickens were sisters at birth but that, in the one which appeared to be a rooster, the ovary had been removed and four testicles from other roosters had been transplanted shortly after hatching. The head and plumage was that of a rooster as well as the shape of the body. It even had fairly well developed spurs.

In another series of chickens he had been using roosters only for his experiments. Here he started by removing testicles—one-eighth at a time, until he had removed seven-eighths of the testicles. As the greater amounts were removed, the birds gradually changed in their physical development so that they approached to the shape of the head and body of the hen, i. e., the head approached the triangular shape head which is characteristic of the hen, and the bulky breast of the rooster gradually became smaller as is characteristic of the hen. There was very little change in the plumage in these cases.

From a practical point of view, I do not think it yet amounts to much but that it may have a future.

Dr. S. R. Maxeiner: I am going to give you just the notes as I took them from Strauss's clinic. His first case was one of pyloric stenosis. He reported that he had done 384 operations for congenital pyloric stenosis with eight deaths. I do not know of any place elsewhere the same record has been made. He made several interesting statements which I jotted down. The first was that he was repeatedly called to the infants' home where he was on the staff, to operate a case of pyloric stenosis that had developed within the first week; but those were never true cases of pyloric stenosis. He said that in the history of his 384 cases there was not one exception where there was an actual pyloric stenosis which developed before the tenth day. The average was between the tenth and the fourteenth day, and frequently the symptoms did not develop before the third week.

Pyloric stenosis, he states, is due to hypertrophy of the pyloric muscle. For instance, he compares it to the arm of the blacksmith who, constantly swinging a hammer, develops an enormous biceps. The pyloric muscle in these infants is constantly in a rhythmic, spasmodic contraction, and due to this rhythmic contraction it becomes extremely hypertrophied. That is what he calls a real, true hypertrophic stenosis.

He speaks of what is called the water test. These babies are placed upon the table, stripped, and the abdomen is inspected. Frequently in the normal child peristaltic waves are noticed in the stomach, but these are small rhythmic contractions. In the real pyloric stenosis case he gives a small amount of water from a bottle, and there immediately occurs a peristaltic contraction in the stomach; and because of the spasm of the pylorus, these waves are what he calls big waves, and are absolutely characteristic of these pyloric conditions. Then he follows this by a small amount of bismuth which is put into the stomach. The baby is turned from side to side, and then the stomach is emptied. There is no bismuth left in the stomach except what coats the sides. Then under the fluoroscope he demonstrates conclusively these same large waves that he sees through the abdominal wall.

He states that the amount of obstruction varies from 20 to 100 per cent. In cases of 100 per cent the procedure is obvious. Cases where there is less than 50 per cent retention in the stomach produce a normal stool; and as a result he does not believe that the stool is of any particular value in these cases. You may get a starvation stool in anything over 50 per cent retention. In cases where there is more than a 50 per cent retention, he says to operate immediately. He states that the cardinal points in diagnosis are this water test, with the visible peristaltic waves, projectile vomiting, and the interval of ten to fourteen days before the onset of symptoms. The palpation of the tumor is of no importance whatever. Emaciation depends entirely on the length of time and the amount of obstruction. All of his bad cases are preceded by a transfusion into the longitudinal sinus of 75 c.c. of blood; and frequently he gives 5 per cent glucose or salt solution also into the longitudinal sinus. When the operation is done on very bad cases, or the children show evidence of shock —that is, not exactly shock, but show the effect of the operation—he follows with another transfusion of 75 c.c. of blood.

The technic of his operation for pyloric stenosis is described in the system of surgery by Ochsner.

Dr. James A. Johnson: One of the interesting things I observed in A. J. Ochsner's clinic, during the meeting of the Clinical Congress in Chicago, was the experimental work done by Dr. Nuzum on the causation of cancer. Dr. Nuzum had isolated an anerobic organism from a human breast cancer. This organism he had cultured and injected repeatedly into the breasts of ten dogs. Finally one of the older dogs developed a cancer of the breast

which progressed to a fatal termination—the post-mortem showing extensive metastases into practically every organ. Dr. Nuzum had been quite enthusiastic about discovering the cause of cancer; and Dr. A. J. Ochsner, in one of his discussions of the subject, stated that he believed Dr. Nuzum's organism was the cause of cancer.

However, with further experimentation Dr. Nuzum has not been able to isolate his organism from the cancer, which he produced, and transplant it to other animals.

Dr. Nuzum now does not believe that the organism was the direct cause of the cancer, but that it was in all probability due to the constant irritation both mechanical and bacterial which he produced by the constant injection into the breast.

Dr. S. H. Baxter read a paper entitled, "Retroperitoneal Tumor." (See page 42.)

At the conclusion of the program all the members of the Society stood in silent tribute to the memory of Dr. Warren A. Dennis, of St. Paul, news of whose death had just been received.

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE CAUSE OF BOTHRIOCEPHALUS ANEMIA: Russel L. Haden (Amer. Jour. Med. Sc.). The broad tapeworm is most commonly encountered in the Baltic provinces of Russia, the Scandinavian peninsula and certain parts of Switzerland, and is the most common tapeworm of China and Japan. The intermediate host is fish, and man is infected by eating raw or improperly cooked fish containing the cysticercus stage of the parasite. The case reports in the United States have not been very numerous, but the paucity may be partially due to lack of careful observation.

Unlike the secondary anaemia occurring in other parasitic infections, the picture of anaemic in bothriocephalus infections cannot be distinguished clinically from true idiopathic pernicious anaemia. The similarity in the clinical picture has excited interest among research workers, in the hope that a solution of the cause of anemia in bothriocephalus infections may throw some light on the cause of pernicious anemia. Attempts to reproduce the anemia with extracts from normal worm have not been successful. Schaumann and Tallquist found that by feeding or injecting subcutaneously dogs with worms which had been subjected to tryptic digestion, an anemia could be produced. Faust and Tallquist noted that the worms recovered from patients having anemia show a great deal of loss of substance—sometimes as much as 60 per cent per unit of length, as compared with the normal worm. The cause of this distintegration is not clear.

The author reports a case in which infestation had apparently occurred six years previous to coming to the United States from Finland, as he had passed segments of tapeworm at intervals for at least two years. The patient had developed rather sudden symptoms of anemia, and on recovery the worm was found with its segments densely intertwined and undergoing disintegration. Haden believes that this is corroborative of Tallquist's observation that worms recovered from patients with anemia show loss of substance, and that the onset of symptoms is due to the death of the worm and the anaemia due to the absorption of decomposition products. The condition of the patient improved promptly after the passage of the worm, and after sixteen days the red blood count had advanced from 2,000,000 to 3,673,000, and ova could no longer be found in the stools.

F. J. HIRSCHBOECK.

MECHANISM OF PRODUCTION OF BREATH SOUNDS: P. Martini (Arch. Int. Med., September 15, 1923). Just as on percussing the air-containing lung the specific sounds of the two naturally dependent and connected systems (chest wall and lung) determine the percussion sound, so the breath sound over the air-containing lung is composed of two specific sounds: that of the bronchial system and that of the air-containing lung tissue.

Only the sound of the chest is heard on percussion over a massively infiltrated lung, the lung itself remaining mute. The specific sound of the infiltrated lung has no part in the bronchial breathing heard over it. Pathologic bronchial breathing is the expression of correctly transmitted vibrations. During the respiration the air in the bronchi is caused to vibrate in the form of split and cut sounds. The glottis is not necessary for this purpose. The importance of the laws of forced vibrations in the problem of auscultation is stressed.

T. A. PEPPARD.

SURGERY

SUPERVISORS:
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THE RELATION OF RIGHT-SIDED ABDOMINAL PAIN TO RIGHT-SIDED DISEASE: R. C. Coffey (Jour. of the Amer. Med. Assn., September 15, 1923). Right-sided abdominal pain is often due to other causes than pathological conditions in the gall-bladder, head of the pancreas, right kidney, appendix, and right ovary.

A study of a class of cases described by Wilms, Klose and Lichty has convinced the author that a large percentage of the cases of chronic right-sided abdominal pain are the result of defective fixation of the ascending colon. This defective fixation is due to four degrees of defective fusion of the primitive mesentery of the colon in fetal life. The

second degree is where the colon has rotated as far as the kidney and has become attached to its anterior surface, leaving the ascending colon and cecum mobile. This group creates most of the trouble.

"Pain resulting from defective peritoneal fusion is directly produced in two ways: (1) by distention of a mobile prolapsed cecum, and (2) by traction on acquired membranes or bands which help to carry the weight of the organs below."

One case is described in detail and a description by Waugh is given. The characteristic features are (1) appearance of an absolutely irregular right-sided pain at the age of 20 or 25, (2) mild indigestion not affected by diet, bad habits, or unsuitable environment, (3) loss of weight and profound lassitude, and (4) general tissue wasting and degeneration in the later stages.

The author cites one case in which the following chain of pathological changes developed as a result of nonfixation of the right colon:

1. Nonfixation of the cecum and ascending colon.
2. High fixation of the appendix and its mesentery well up under the liver.
3. Fixation of the hepatic flexure to the front surface of the kidney, with acquired membranous development to strengthen the supports.
4. Acquired membranes attending from the parietal peritoneum across to the mobile colon.
5. Acquired membranes along the under surface of the first part of the transverse mesocolon for the extra support of this part of the colon.
6. One band extending along the omentum from the colon to the under surface of the gall-bladder.
7. Another extending from the colon across the duodenum making extra fixation.
8. A midline ptosis probably due to dilatation of the stomach, secondary to dilatation of the duodenum, which was produced by duodenal arteriomesenteric ileus.

"Forced feeding and fattening will relieve a certain number of these patients of their pain, but painful conditions of the right side of the abdomen are usually best treated by surgical measures, which usually consist of shortening the mesentery of the cecum and ascending colon and fixing it to the posterior lateral parietal peritoneum by interrupted sutures without actually sewing the intestinal wall. At the hepatic flexure the line of interrupted sutures is gradually brought forward on the lateral parietal peritoneum, picking up the mesentery of the colon, attaching it to the front wall until the beginning of the omentum is reached, when the omentum is attached to the anterior abdominal wall over as far as the midline and sometimes 3 or 4 inches beyond. If the cecum is extremely dilated, plication may be performed."

"At present I do not hesitate to operate for long continued annoying right sided pain with the positive assurance that in the majority of all cases I shall be able to relieve the pain whether it is due to organic lesions or to inorganic disease accompanying defective peritoneal fusion."

W. P. Herbst.

PEDIATRICS

SUPERVISORS:
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LA SALLE BLDG., MINNEAPOLIS
ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

UBER SCHWERE FORMEN VON ANAMIE BEI SEPTISCHEN ERKRANKUNGEN: Max Frank (Archiv fur Kinderheilkunde, July 21, 1923). The author presents three cases of severe secondary anemia in infants.

In two of these positive blood cultures were present. One, a urinary infection, had bacilli coli in the blood stream. The other was a general infection resulting from multiple skin abscesses, and showed staphylococci in the organs at postmortem.

The third case was a generalized infection following a bronchitis in a poorly nourished infant. No positive blood or organ culture was demonstrated in this case.

All three patients showed a severe, rapidly developing anemia, with a color index less than one. Anisocytosis, poikilocytosis and polychromatophilia were present in all cases.

In those in whom positive cultures were found, the nucleated red blood corpuscles were diminished, the leucocyte counts were only slightly elevated, and the platelet counts were definitely reduced, as low as 7,400 per cu. mm.

On the other hand, in the third case, where a pyemia rather than a septicemia was present, the leucocyte count was markedly elevated, the nucleated red blood cells were numerous and the platelets were within normal limits. A few neutrophilic myelocytes and even myoblasts were seen.

The bone marrow in the cases of septicemia showed a definite diminution in the number of P. M. N. neutrophiles and giant cells. These elements of the bone marrow were normal in the case of pyemia.

Frank believes that in the cases of septicemia there is a hypoplasia of the bone marrow due to the action of bacterial toxines. This condition is not present in pyemias where one sees a normally reacting bone marrow.

H. S. Lippman.

THE IODIN TREATMENT OF GOITER IN OLDER GIRLS: W. Silberschmidt (Schweizerische Medizinische Wochensch, Basel, July 1923). Silberschmidt reports the result of the systematic administration of iodin tablets to girls ranging from 15 to 22 years of age. From two years' observation he concludes that this treatment is borne well, is harmless, and that many pronounced goiters retrogress. The beneficial results apparently are more marked in individuals having soft, than in those having hard goiters. He states also, that the iodin treatment is undoubtedly more promising for children than for adults. Goiters having connective tissue infiltration are not likely to show much benefit from the administration of iodin tablets or iodized salt.

C. A. Stewart.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

THE DIETARY OF HEALTH AND DISEASE. Gertrude I. Thomas, Instructor in Dietetics, University of Minnesota. 210 pages. Illustrated. Philadelphia and New York: Lea & Febiger, 1923. Cloth, $2.25.

MODERN ASPECTS OF THE CIRCULATION IN HEALTH AND DISEASE. Carl J. Wiggers, M.D., Professor of Physiology in the School of Medicine, Western Reserve University, Cleveland. 2d edition, revised. 662 pages. Illustrated with 204 engravings. Philadelphia and New York: Lea & Febiger, 1923. Cloth, $7.50.

A MANUAL OF PROCTOLOGY. T. Chittenden Hill, Ph.B., M.D., F.R.C.S., Instructor of Proctology, Harvard Graduate School of Medicine; Surgeon to Rectal Department, Boston Dispensary; Ex-President American Proctologic Society. 279 pages. Illustrated with 84 engravings. Philadelphia and New York: Lea & Febiger, 1923. Cloth, $3.25.

DISEASES OF THE SKIN. Frank Crozer Knowles, M.D., Professor of Dermatology, Jefferson Medical College, Lieutenant-Colonel Medical Reserve Corps, U. S. A.; Dermatologist of the Philadelphia General, the Presbyterian, the Children's and the Babies' Hospitals; Chief of Clinic, Dermatological Department, Pennsylvania Hospital, etc. 2d edition, revised. 595 pages. 229 illustrations and 14 plates. Philadelphia and New York: Lea & Febiger, 1923. Cloth, $6.50.

THE TREATMENT OF DIABETES MELLITUS. Elliott P. Joslin, M.D. (Harvard), M.A. (Yale); Clinical Professor of Medicine, Harvard Medical School; Consulting Physician, Boston City Hospital; Physician to New England Deaconess Hospital. 3d edition, revised and enlarged. 784 pages. Illustrated. Philadelphia & New York: Lea & Febiger, 1923. Cloth, $8.00.

RHUS DERMATITIS (Poison Ivy): Its Pathology and Chemotherapy. James B. McNair, University of Chicago. 298 pages. 15 illustrations. 3 plates. University of Chicago Press, 1923.

DIATHERMY AND ITS APPLICATION TO PNEUMONIA. Harry Eaton Stewart, M.D., attending specialist in physiotherapy, U. S. Marine Hospitals, New York; consultant in physiotherapy, U. S. V. B. Hospital, New Haven, Conn.; director New Haven School of Physiotherapy; formerly assistant director, Section of Physiotherapy, Office of the Surgeon General, U. S. Army, and Supervisor of Physiotherapy, Bureau of U. S. Public Health Service, Washington, D. C. 210 pages. New York: Paul B. Hoeber, Inc., 1923. Cloth, $3.00.

THE TREATMENT OF DIABETES MELLITUS WITH OBSERVATIONS BASED UPON THREE THOUSAND CASES. Elliott P. Joslin, M.D. (Harvard), M.A. (Yale). Third edition, enlarged, revised and rewritten. Lea & Febiger. Price, $8.00.

This edition contains many new sections. The sections of insulin, pathology, respiratory metabolism, levulose, duodenal ulcer and diabetes of twenty years' standing have appeared for the first time. Marsh and Newburgh methods of treating diabetes are also very clearly and impartially discussed. Much room is given to the discussion of the modern conceptions of acidosis. While the second edition contains numerous tables, the third has many additional ones. Among the more important are the tables of diabetic and non-diabetic foods by Dr. E. M. Bailey and the tables for predicting the metabolism by Harris and Benedict. Numerous parts here and there through the entire book have been either supplemented or somewhat changed due to the introduction of insulin treatment and the acquisition of a more exact knowledge based on numerous experiments and observations during the last decade. The section on surgery has been entirely rewritten.

The work has no equal. Its growth has been phenomenal. Six years ago the author based his treatment on thirteen hundred cases. His treatment of diabetes now is based on three thousand cases. "To Banting and Best and the Toronto Group of Insulin Workers" is dedicated this masterly production. This same spirit which prompted the author to dedicate his work to the above men characterizes also the impartial discussion of any contribution, regardless of how insignificant its source may have been, to the better understanding of diabetes. No one attempting to treat diabetes can be without this work.

J. A. LEPAK, M.D.

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